Coral Reefs
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RESEARCH

New records of fishes from the Coral Sea Marine Park, Australia

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Abstract With an area covering just under 1 million km^2, Australia's Coral Sea Marine Park (CSMP) is among the largest marine protected areas globally. Yet, the demersal deep-reef fish fauna of the CSMP remains poorly described, due in part to its remote location, as well as its sheer size, much of which is inaccessible below conventional SCUBA diving depths. Recent remotely operated vehicle (ROV) explorations conducted by the Schmidt Ocean Institute provided an opportunity to explore the benthic ichthyofauna of deep mesophotic and rariphotic coral ecosystems. Contributions to the deep, demersal ichthyofauna of Australia's CSMP are herein supplemented with an integrative dataset consisting of ROV imagery and specimen vouchers. Sixty-two new records of fishes from 26 families are reported from the CSMP. Of these, 45 are new Australian records, one of which is also a new family record for Australia. Four species are new records for the Southern Hemisphere, and 21 species are potentially new to science. We report new voucher material for 29 species, including several species previously identified as new for the CSMP with no voucher specimens.

Fenton Walsh: Submitted posthumously.

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Introduction

The Coral Sea is the second largest tropical marginal sea, situated in the Southern Hemisphere, and extending approximately 2000 km down the north-eastern coast of Australia (McKinnon et al. 2014). It includes Australia's Great Barrier Reef (GBR) along its western margin and is bounded by the Melanesian portion of the Coral Triangle to the north (Papua New Guinea and the Solomon Islands), Vanuatu and New Caledonia to the east, and the Tasman Sea to the south (Galbraith et al. 2024; Fig. 1).

Despite its proximity to several hyper-diverse regions, the fish biodiversity of the Coral Sea remains largely unknown. Surveys of coral reef habitats across the Coral Sea have been disproportionate, with coverage concentrated mostly to New Caledonia and its surrounding waters (Fricke et al. 2011), or within Australia's Coral Sea Marine Park (CSMP). The latter extends from the eastward margin of the GBR to the

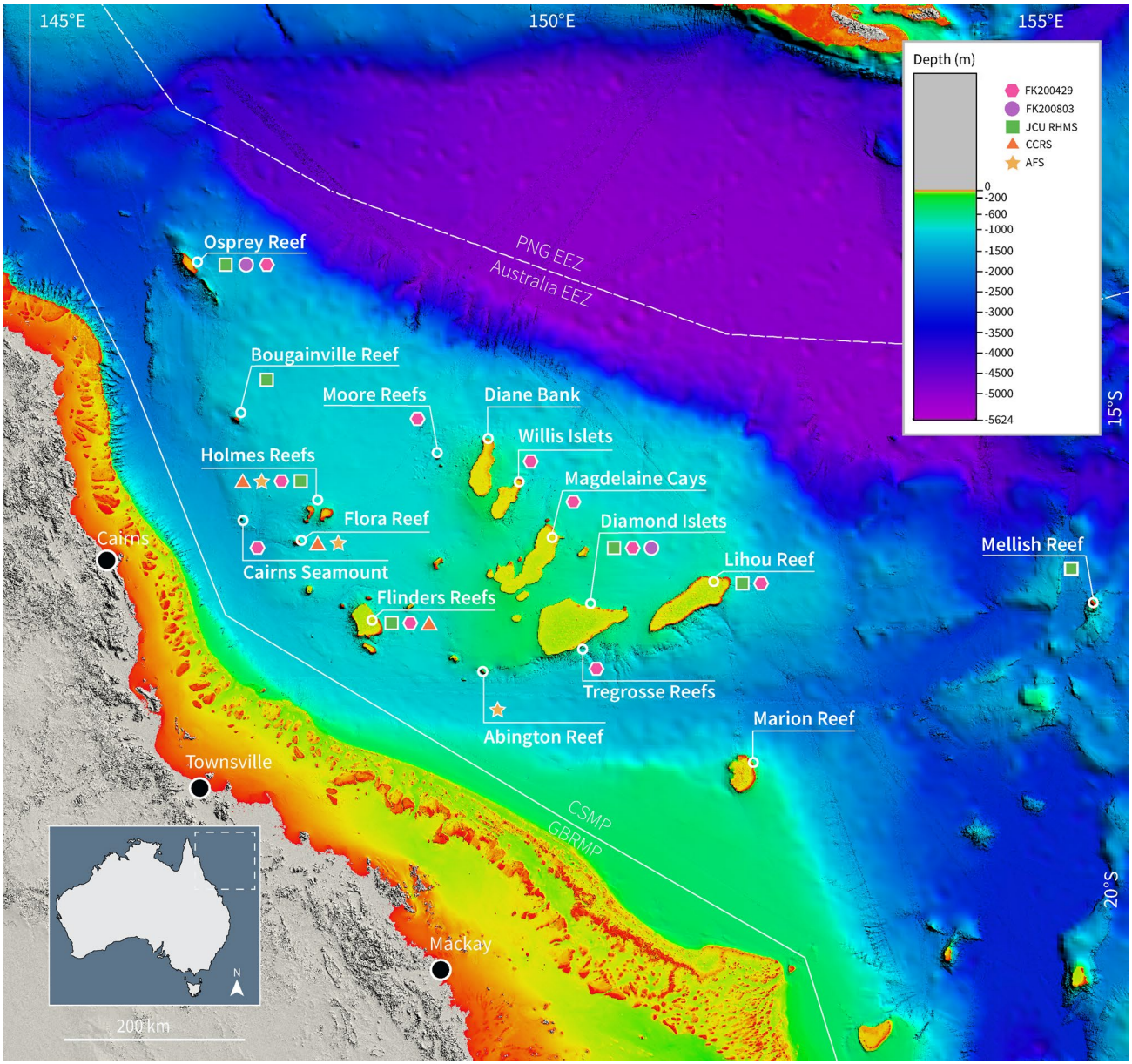

Fig. 1 Bathymetric map of the Coral Sea Marine Park. Coloured symbols correspond to survey methods conducted at respective sites. Pink octagon: RV *Falkor* 'Visioning the Coral Sea Marine Park' FK200429 expedition; Purple circle: RV *Falkor* 'Seamounts, Canyons and Reefs of the Coral Sea' FK200802 expedition; Green square: James Cook University Reef Health Monitoring Survey; Orange triangle: closed-circuit rebreather mesophotic surveys; Yellow star: aquarium fish specimens

outer extent of Australia's Exclusive Economic Zone some 1200 km from the Australian mainland (Hoey et al. 2022). Most reef ecosystems of the Coral Sea lie within this remote marine park, with an area of just under 1 million km^2, making it among the largest protected areas globally (Bridge et al. 2013). While a comprehensive checklist of fishes in the CSMP is lacking, large-scale monitoring efforts (Hoey et al. 2020; 2022) and baseline surveys (Ayling and Ayling 1985; Oxley et al. 2004; Edgar et al. 2015) have contributed to quantitative fish diversity data from the CSMP.

More focused checklists have been provided by various authors in recent years. Last et al. (2014) provided a detailed checklist of deepwater demersal ichthyofauna collected by scampi (*Metanephrops*) and penaid prawn trawls between 46 and 1200 m (mostly 196–800 m) in the western Coral Sea, based on voucher specimens retained from two exploratory voyages conducted by the CSIRO research vessel *Soela* in 1985 and 1986. They reported 393 species of fishes from 125 families, of which 20% and 24% represented new Australian records and new species, respectively. Gill et al. (2021) reviewed Australian species of *Plectranthias*, reporting two new records for the CSMP. Hoey et al. (2022) reported 640 species of coral reef fishes based on surveys conducted over a 5-year period, 12 of which were new records for the CSMP. Galbraith et al. (2024) reported new occurrence records for 50 species of coral reef fishes, of which 16 were from mesophotic communities in seamounts in the CSMP based on data obtained from remotely operated vehicles (ROV) and baited remote underwater video systems (BRUVs).

It is likely that the true biodiversity estimate of fishes in the CSMP is under-represented given that the CSMP is; (i) remotely located and spans a large area proximal to several major biogeographic regions; (ii) characterised by complex bathymetry with a variety of marine habitats, including submerged banks, deep canyons, island chains, seamounts, and coral reef atolls (Bridge et al. 2013); and (iii) largely inaccessible below 30 m due to restrictive institutional and occupational dive regulations in Australia (Eyal et al. 2021). For the most part, inaccessibility of deep, rough-bottom habitat and the relative difficulty in collecting quality specimens are contributing factors towards this dearth of biodiversity data. For example, mesophotic coral ecosystems (MCEs) between 30 and 150 m and rariphotic ecosystems between 130 and 309 m are faunistically unique realms with high habitat complexity, endemism, and uncharacterised biodiversity (Loya et al. 2016; Baldwin et al. 2018; Rocha et al. 2018; Pyle et al. 2019) yet are excluded from most biodiversity surveys conducted in the CSMP.

Efforts to bridge the knowledge gap of ichthyofauna in the CSMP have continued in recent years, with a small but growing number of vouchered specimens provided by aquarium fish collectors, and commercial and recreational anglers. Commercial avenues for obtaining scientific material such as these can be valuable, provided specimens are obtained legally and with the necessary paperwork, the detailed locality data retained at time of capture and eventually accessioned in a scientific institution. For example, in the last decade alone, seven species with type localities located within the CSMP have been described through material provided by commercial aquarium fish collectors: *Pseudocoris aequalis* (Randall and Walsh 2008); *Rabaulichthys squirei* (Randall and Walsh 2010); *Cirrhilabrus squirei* (Walsh 2014); *Plectranthias bennetti* (Allen and Walsh 2015); *Bodianus bennetti* (Gomon and Walsh 2016); *Tosanoides bennetti* (Allen and Walsh 2019); and *Paracheilinus amanda* (Tea and Walsh 2023). All but two of these occur exclusively within MCEs.

Innovations in remote underwater imagery systems, as well as renewed interests from private or philanthropic enterprises, have greatly expanded our ability to study mesophotic, rariphotic, and deeper ecosystems. For example, recent efforts to characterise demersal fish assemblages using high-quality imagery from ROV, BRUVs, and other similar methods have contributed largely to our understanding of benthic ichthyofauna across the Pacific, particularly with regard to in situ behavioural or ecological interactions (Easton et al. 2017, 2024; Kennedy et al. 2019; Selig et al. 2023).

Here, we report new distributional records for the CSMP based on a combination of underwater imagery and newly vouchered material deposited in museums. The former category includes primary data taken from several major research expeditions carried out between the years 2020 and 2024, notably the Schmidt Ocean Institute's 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition, as well as the Parks Australia coral reef health and monitoring surveys (2021–2024) led by James Cook University.

Materials and methods

The CSMP constitutes a marine protected area extending from the eastward margin of the GBR to the outer extent of Australia's Exclusive Economic Zone, some 1200 km from the Australian mainland (Hoey et al. 2022). Definition of and the areas enclosed within the CSMP are jurisdictional, lying within Australia's Exclusive Economic Zone, and do not necessarily reflect biogeographical boundaries. Spatial limits of the CSMP follow those delimited by Parks Australia (parksaustralia.gov.au).

Records of fishes (excluding chondrichthyans) detailed herein were taken from a combination of the following data sources: (a) underwater video and photographic imagery from ROV and BRUV surveys of fish communities and benthic habitats; (b) vouchered material collected during surveys conducted with closed-circuit rebreather diving; and (c) vouchered material and/or photographs of fishes donated

by aquarium fish collectors and integrated into the reference collection of the following museums: Australian Museum, Sydney (AMS); Bernice Pauahi Bishop Museum, Honolulu (BPBM); the California Academy of Sciences, San Francisco (CAS); the Commonwealth Scientific and Industrial Research Organisation, National Research Collections Australia, Australian National Fish Collection, Hobart (CSIRO); the Queensland Museum, Brisbane (QM); and the Western Australian Museum, Perth (WAM). Institutional codes follow Sabaj (2023). Where available, measurements are presented as standard lengths (SL), measured from the tip of the snout to the hypural crease. Measurements were made with digital callipers, recorded to the nearest 0.1 mm.

Sampling localities corresponding to data types are presented in Fig. 1. A summary table of fish records is provided in Table 1. Presentation of families in the annotated checklist follows the classification in Eschmeyer's Catalog of Fishes (Van der Laan et al. 2024). A checklist for chondrichthyan taxa was not included and will be prepared separately. Detailed methodology for the collection of respective data types is as follows:

ROV surveys of fish communities and benthic habitats

(i) RV *Falkor* and ROV *SuBastian* surveys conducted by Schmidt Ocean Institute: Mapping and exploration of the CSMP was conducted with the 83 m long RV *Falkor* across two expeditions: FK200429 'Visioning the Coral Sea Marine Park' (April to June, 2020; https://schmidtocean.org/cruise/visioning-the-coral-sea-marine-park/) and FK200802 'Seamounts, Canyons and Reefs of the Coral Sea' (August, 2020; https://schmidtocean.org/cruise/seamounts_canyons_reefs_coralsea/). Surveys were conducted at depths ranging between 260 and 1564 m. Throughout these expeditions, the ROV *SuBastian* was deployed from full depth at each site up to sea surface, typically over periods of about 7 h for each dive. The ROV *SuBastian* uses the SULIS Subsea Z70 deep-sea camera featuring 4 K zoom optics and an ultra-wide-angle field of view. The 4 K video format is 3840×2160 pixels at 30 fps. The camera has a 12X optical zoom capability with a diagonal field of view of 93° in full-wide mode and includes 10 cm wide scaling lasers. Navigation data from the ROV *SuBastian* were stored at 1 s interval together with conductivity, temperature and depth (CTD) and oxygen sensor data. Sealog imagery data were framegrabs extracted from 4 K video (3840×2160 pixels) at 5 s interval. Both the 4 K video (also available on YouTube) and framegrabs were examined manually by Y.K.T., T.L.S., A.H., K.P., S.R., J.J.P., J.W.J., A.C.G., B.W.F., and R.J.B. for fish records. ROV imagery was collected under Australian Marine Park Activity Permit Number PA2019-00131-10-12.

(ii) Micro-ROV and BRUV surveys conducted by James Cook University: ROV and BRUV surveys were conducted in the CSMP by James Cook University as part of annual Coral Reef Health Monitoring surveys and the Our Marine Parks Grants Program (Hoey et al. 2022; 2024a, b; Galbraith et al. 2022). A total of 140 locations across 18 reefs were sampled by ROV and BRUV over five separate voyages to the CSMP between 2021 and 2024. ROV video surveys were conducted following methods described in Galbraith et al. (2022, 2024). A total of 1008 30 m belt-transects were conducted in all major habitats including lagoons and inner and outer reefs on both reef crests and slopes between 1 and 110 m. When stereo-video systems (SVS) were used on the ROV, cameras (Paralenz or GoPro Hero8) were mounted with separation of 500 mm and inward convergence of 5°. SVS were calibrated prior to each voyage using the software CAL (https://www.seagis.com.au/bundle.html) and associated calibration methods and guidelines (Harvey and Shortis 1998; Shortis and Harvey 1998).

Single-camera BRUVs (GoPro Hero7 cameras) were deployed at depths between 20 and 100 m following standard operating procedures detailed in Langlois et al. (2020) each with a minimum soak time of 1 hr. BRUV sampling was conducted in lagoons, inner reef, and reef pass habitats only due to the steep-sided nature of many Coral Sea reefs. All ROV and BRUV video footage data were analysed in the software EventMeasure or EventMeasure Stereo (http://www.seagis.com.au) by G.F.G., B.J.C. and Eva C. McClure following established techniques for fish video surveys from ROV, SVS and BRUVs, where all fish were identified to the lowest taxonomic level possible (Shortis and Abdo 2016; Goetze et al. 2019; Langlois et al. 2020; Hellmrich et al. 2023).

Closed-circuit rebreather dive surveys

Rebreather dives were conducted by T.B., L.A.R., and G.B. between 25 March 2024 to 3 April 2024, as part of a joint expedition between the Australian Museum and the California Academy of Science to survey deep, mesophotic fish communities of the CSMP. Fishes were collected by T.B. and L.A.R. using hand nets while diving with mixed gas, closed-circuit rebreathers in accordance with permits issued by Park Australia (PA2023-00143-1; AU-COM2023-599), Great Barrier Reef Marine Park Authority (G49492-1), and Department of Agriculture and Fisheries, Queensland (270,856). Sites surveyed in the CSMP include Flora Reef, Flinders Reef, and Holmes Reef (Fig. 1). Collected specimens were euthanased in accordance with the animal care and ethics guidelines stipulated by the Australian Museum (ACEC project no. 23-02) and the California Academy of Sciences (IACUC project no. 2022-01). Prior

Table 1 Summary table of fishes of the Coral Sea Marine Park, including new records and those with new voucher material

Family/species	Location (CSMP)	Depth	New Record	Voucher	Faunal affinity	Figure
AULOPIDAE						
Hime sp. A	Lihou Reef[a]	368 m	CSMP[S]; AU[S]	No	UTA	Figure 2
OPHIDIIDAE						
Neobythites sp. A	Lihou Reef[a]	525 m	CSMP[S]; AU[S]	No	UTA	Figure 3
GOBIIDAE						
Obliquogobius cf *trifasciatus*	Lihou Reef[a]	280 m	CSMP[S]	No	UTA	Figure 4
Tryssogobius sp. A	Tregrosse Reefs[a]	109 m	CSMP[G,S]; AU[G,S]	No	UTA	Figure 5
DRACONETTIDAE						
Centrodraco cf *nakaboi*	Magdelaine Cays[a]	603 m	CSMP[G,S]; AU[S]	No	UTA	Figure 6
GEMPYLIDAE						
Epinnula rex	Magdelaine Cays[a]	561 m	CSMP[G,S]; AU[G,S]	No	WP; CP	Figure 7
POMACENTRIDAE						
Azurina brevirostris	Tregrosse Reefs[a]; Lihou Reef[a]; Diamond Islets[c]; Marion Reef[c]; Mellish Reef[c]; Bougainville Reef[c]; Holmes Reef[d]; Flora Reef[d,e]	50–140 m	CSMP[G,S]	Yes	WP; CP; SP	Figure 8A
Chromis cf *bowesi*	Holmes Reef[d]	142 m	CSMP[S]; AU[S]	Yes	WP	Figure 8B
Chromis circumaurea	Moore Reefs[a]; Flora Reef[d]; Holmes Reef[e]	120–195 m	CSMP[S]	Yes	WP; CP	Figure 8C
Chromis degruyi	Lihou Reef[a]; Flora Reef[d]	94–118 m	CSMP[S]; AU[S]	No	WP; CP	Figure 8D
Chromis earina	Flinders Reef[d]	105 m	CSMP[S]; AU[S]	No	WP	Figure 8E
Chromis sp. A	Lihou Reef[a]; Willis Islets[a]	148–206 m	CSMP[S]	No	UTA	Figure 8F
SERRANIDAE						
Chelidoperca sp. A	Flora Reef[d]	85 m	CSMP[S]; AU[S]	No	UTA	Figure 9
ANTHIADIDAE						
Odontanthias borbonius	Lihou Reef[a]; Holmes Reef[e]; Flora Reef[e]	122–146 m	CSMP[G,S]; AU[S]	Yes	IWP	Figure 10A
Odontanthias tapui	Holmes Reef[a]; Willis Islets[a]; Diamond Islets[a]; Magdelaine Cays[a]; Osprey Reef[a,b]	220–538 m	CSMP[S]; AU[S]	No	SP	Figure 10B
Odontanthias wassi	Moore Reefs[a]; Lihou Reef[a]; Magdelaine Cays[a]; Holmes Reef[e]	120–190 m	CSMP[S]; AU[S]	Yes	SP	Figure 10C
Odontanthias sp. A	Magdelaine Cays[a]; Lihou Reef[a]	322–515 m	CSMP[S]; AU[S]	No	UTA	Figure 10D
Plectranthias pelicieri	Tregrosse Reefs[a]	133 m	CSMP[S]; AU[S]	No	IWP	Figure 11A
Plectranthias randalli	Tregrosse Reefs[b]	309 m	CSMP[S]; AU[S]	No	WP	Figure 11B
Plectranthias sp. A	Magdelaine Cays[a]	490 m	CSMP[S]; AU[S]	No	UTA	Figure 11C
Plectranthias sp. B	Magdelaine Cays[a]; Lihou Reef[a]; Diamond Islets[a]	456–532 m	CSMP[S]; AU[S]	No	UTA	Figure 11D
Plectranthias sp. C	Lihou Reef[a]	303 m	CSMP[S]; AU[S]	No	UTA	Figure 11E
Plectranthias sp. D	Flora Reef[d]	135 m	CSMP[S]; AU[S]	Yes	UTA	Figure 11F

Table 1 (continued)

Family/species	Location (CSMP)	Depth	New Record	Voucher	Faunal affinity	Figure
Pseudanthias flavicauda	Holmes Reef[e]; Flora Reef[e]; Osprey Reef[e]; Lihou Reef[f]; Bougainville Reef[f]	30–92 m	Previously reported in Galbraith et al. (2024) based on ROV images from Osprey Reef, Lihou Reef, and Bougainville Reef, but without specimen vouchers	Yes	SP	Figure 12
Pseudanthias cf *rubrolineatus*	Willis Islets[a]; Lihou Reef[a]; Diamond Islets[d]	104–205 m	CSMP[S]	Yes	WP	Figure 13
Pyronotanthias parvirostris	Flora Reef[e]	46 m	Previously reported in Allen and Erdmann (2012) but without specimen, imagery, or specific geographical data beyond "Coral Sea"	Yes	IWP	Figure 14
Tosanoides bennetti	Willis Islets[a]; Magdelaine Cays[a]; Lihou Reef[a]; Flora Reef[d]; Holmes Reef[f]	124–215 m	Previously known from the type series from Holmes Reef (Allen and Walsh 2019)	Yes	SP	Figure 15
LIOPROPOMATIDAE						
Liopropoma japonicum	Lihou Reef[a]	286 m	CSMP[S]; AU[S]; SH[S]	No	NWP	Figure 16
SCORPAENIDAE						
Rhinopias argoliba	Tregrosse Reefs[b]	195 m	CSMP[S]; AU[S]; SH[S]	No	NWP	Figure 17
LABRIDAE						
Bodianus masudai	Holmes Reef[e]	142 m	CSMP[S]	No	NWP; SP	Figure 18A
Bodianus paraleucosticticus	Lihou Reef[a,f]; Flora Reef [d]; Holmes Reef[d,e]; Osprey Reef[f]	70–142 m	Previously reported in Galbraith et al. (2024) based on ROV images from Lihou Reef and Osprey Reef, but without specimen vouchers	Yes	SP	Figure 18B
Bodianus thoracotaeniatus	Holmes Reef[a]	373 m	CSMP[S]; AU[S]; SH[S]	No	NWP	Figure 18C
Cirrhilabrus beauperryi	Holmes Reef[e]	12 m	CSMP[S]; AU[S]	Yes	NG	Figure 18D
Cirrhilabrus roseafascia	Lihou Reef[a]; Osprey Reef[b,f]; Flinders Reef[d]; Holmes Reef[e]; Tregrosse Reefs[a,f]	91–187 m	Previously reported in Galbraith et al. (2024) based on ROV images from Osprey Reef and the Diamond Islets, but without specimen vouchers	Yes	WP; SP	Figure 18E
Decodon sp. A	Willis Islets[a]	207 m	CSMP[S]	Yes	UTA	Figure 18F
Halichoeres melasmapomus	Holmes Reef[e]	12 m	Previously reported in Galbraith et al. (2024) based on BRUV images from Wreck Reef but without specimen vouchers	Yes	WP	Figure 18G
Oxycheilinus arenatus	Lihou Reef[a]; Holmes Reef[c]; Mellish Reef[c]; Diamond Islets[c]; Flinders Reef[d]	45–176 m	CSMP[S]; AU[S]	No	IWP	Figure 18H
Paracheilinus filamentosus	Flora Reef[e]	45 m	CSMP[S]	Yes	NG	Figure 18I
Pseudojuloides mesostigma	Holmes Reef[e]	65 m	CSMP[S]; AU[S]	Yes	WP; CP	Figure 19
Suezichthys sp. A	Lihou Reef[a]; Holmes Reef[e]	145–187 m	CSMP[G,S]	? see species account	UTA	Figure 20A–C
Terelabrus rubrovittatus	Lihou Reef[a]; Flora Reef[d]; Holmes Reef[e]	130–146 m	CSMP[G,S]; AU[S]	Yes	IWP; SP	Figure 21
PINGUIPEDIDAE						
Parapercis sp. A	Tregrosse Reefs[a]	163 m	CSMP[S]; AU[S]	No	UTA	Figure 22
SYMPHYSANODONTIDAE						

Table 1 (continued)

Family/species	Location (CSMP)	Depth	New Record	Voucher	Faunal affinity	Figure
Cymatognathus aureolateralis	Lihou Reef[a]; Osprey Reef[a]; Tregrosse Reefs[a]	246–301 m	CSMP^{G,S}; AU^{G,S}	No	WP	Figure 23
EPIGONIDAE						
Sphyraenops bairdianus	Lihou Reef[a]	360–370 m	CSMP^{G,S}	No	CG	Figure 24
PSEUDOTRICHONOTIDAE						
Pseudotrichonotus sp. A	Tregrosse Reefs[b]	195 m	CSMP^{F,G,S}; AU^{S}	No	UTA	Figure 25
LUTJANIDAE						
Paracaesio kusakarii	Lihou Reef[a]	353 m	CSMP^{S}	No	WP	Figure 26
MALACANTHIDAE						
Hoplolatilus chlupatyi	Holmes Reef[e]	70 m	CSMP^{S}	Yes	IWP	Figure 27
POMACANTHIDAE						
Centropyge abei	Willis Islets[a]; Flinders Reef[d]; Flora Reef[d,e]; Holmes Reef[e]	135–211 m	CSMP^{S}; AU^{S}	Yes	WP	Figure 28A
Centropyge colini	Holmes Reef[d,e]; Flora Reef[d,e]	60–112 m	CSMP^{S}	Yes	IWP	Figure 28B
Centropyge multicolor	Mellish Reef[c]; Holmes Reef[e]	42–82 m	CSMP^{S}; AU^{S}	Yes	WP; CP	Figure 28C
Centropyge nigriocellus	Holmes Reef[e]	15 m	CSMP^{S}; AU^{S}	No	WP; CP; SP	Figure 28D
Chaetodontoplus niger	Lihou Reef[a]; Tregrosse Reefs[a]	97–134 m	CSMP^{S}; AU^{S}	No	NWP; SP	Figure 28E
Genicanthus bellus	Moore Reefs[a]; Magdelaine Cays[a]; Lihou Reef[a]; Flinders Reef[a,d]; Flora Reef[d]; Osprey Reef[f]; Bougainville Reef[f]	66–171 m	Previously reported in Galbraith et al. (2023) based on ROV images from Osprey Reef and Bougainville Reef, but without specimen vouchers	Yes	IWP; CP; SP	Figure 28F
CHAETODONTIDAE						
Chaetodon burgessi	Flora Reef[d]; Holmes Reef[e]	110–145 m	CSMP^{S}; AU^{S}	Yes	WP; CP	Figure 29A
Prognathodes cf *geminus*	Magdelaine Cays[a]; Tregrosse Reefs[a]; Flora Reef[d]; Holmes Reef[e]	138–184 m	CSMP^{G,S}; AU^{G,S}	Yes	UTA	Figure 29B
Prognathodes guyotensis	Magdelaine Cays[a]	320 m	CSMP^{S}; AU^{S}	No	IWP	Figure 29C
Roa cf *excelsa*	Lihou Reef[a]; Willis Islets[a]	204–225 m	CSMP^{G,S}; AU^{S}	No	UTA	Figure 29D
CALLANTHIIDAE						
Grammatonotus laysanus	Osprey Reef[a]; Moore Reefs[a]	311–497 m	CSMP^{S}; AU^{S}	No	CP; NWP; EP	Figure 30A
Grammatonotus sp. A	Holmes Reef[a]	419 m	CSMP^{S}; AU^{S}	No	UTA	Figure 30B
Grammatonotus sp. B	Lihou Reef[a]	369 m	CSMP^{S}; AU^{S}	No	UTA	Figure 30C
Grammatonotus sp. C	Lihou Reef[a]	199–280 m	CSMP^{S}; AU^{S}	No	UTA	Figure 30D
Grammatonotus sp. D	Osprey Reef[b]	383 m	CSMP^{S}; AU^{S}	No	UTA	Figure 30E
PRIACANTHIDAE						
Pristigenys meyeri	Flinders Reef[a]; Lihou Reef[a]; Tregrosse Reefs[a]; Flora Reef[d]; Abington Reef[e]; Osprey Reef[a,f]	137–226 m	Previously reported from Osprey Reef based on ROV images taken by MARUM, University of Bremen, but without specimen vouchers	Yes	IWP	Figure 31
LOPHIIDAE						

Table 1 (continued)

Family/species	Location (CSMP)	Depth	New Record	Voucher	Faunal affinity	Figure
Sladenia sp. A	Moore Reefs[a]	870 m	CSMP[G]	No	UTA	Figure 32A
Sladenia remiger	Diamond Islets[a]	831 m	CSMP[G,S]	Yes	IWP; SP	Figure 32B–D
CHAUNACIDAE						
Chaunax sp. A	Moore Reefs[a]; Lihou Reef[a]	352–456 m	CSMP[S]; AU[S]	No	UTA	Figure 33
Chaunax reticulatus	Flinders Reef[a]	560–635 m	CSMP[S]; AU[S]	No	SWP	Figure 34
THAUMATICHTHYIDAE						
Thaumatichthys sp. A	Cairns Seamount[a]	1500 m	CSMP[F,G,S]; AU[F,G,S]	No	UTA	Figure 35
TRIACANTHODIDAE						
Hollardia goslinei	Diamond Islets[a]	511–513 m	CSMP[G,S]; AU[G,S]; SH[G,S]	No	NWP; CP	Figure 36
MONACANTHIDAE						
Thamnaconus modestoides	Willis Islets[a]	206 m	CSMP[S]	No	IWP	Figure 37
BALISTIDAE						
Rhinecanthus abyssus	Holmes Reef[e]	145 m	CSMP[S]; AU[S]	Yes	IWP	Figure 38
Xanthichthys caeruleolineatus	Flinders Reef[c]; Lihou Reef[c]; Flora Reef[e]; Osprey Reef[c,6]; Holmes Reef[f];	52–86 m	Previously reported in Randall and Munday (1998) based on unpublished observations from Osprey Reef, and in Galbraith et al. (2022) based on ROV images from Holmes Reef, but without specimen vouchers	Yes	IWP	Figure 39

Superscripted values accompanying each location record correspond to the method of data collection and are detailed in the footnotes. Depth range corresponds only to the maximum and minimum depth observed for each species across all localities and method of data collection. In the new records column, *CSMP* Coral Sea Marine Park, *AU* Australia, *SH* Southern Hemisphere, and *UTA* unknown taxonomic affinities. New regional records are accompanied by superscripted letters S, G, and F denoting new species, genus, and family records, respectively. Faunal affinities are estimated based on global distributional records of each species, with biogeographic zones modified from Last et al. (2011) and (2014) (see methods) *WP* Western Pacific, *CP* Central Pacific, *SP* Southern Pacific, *EP* Eastern Pacific, *IWP* Indo-West Pacific, *NWP* Northwest Pacific, *NG* New Guinea, and *CG* Circumglobal. For species with catalogued museum vouchers, their registration numbers are detailed in the list of examined material provided in each species' accounts in the annotated checklist

[a]Observations made during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition FK200429

[b]Observations made during the 2020 RV *Falkor* 'Seamounts, Canyons and Reefs of the Coral Sea' expedition FK200802

[c]Observations made during 2023–2024 JCU Reef Health and Monitoring Surveys

[d]Observations and collections made during closed-circuit rebreather dive surveys

[e]Observations and collections provided by donated aquarium fish specimens

[f]Previously published observations from the literature

to preservation, tissue samples were obtained from the right gill arches and flash frozen in liquid nitrogen. Specimens are deposited in the reference collection of AMS and CAS. In situ underwater photographs were also taken during the survey and are herein included as photographic records.

Aquarium specimens

Between 2020 and 2024, aquarium fish specimens collected commercially for the aquarium fish industry (AMFA permit no. 25721) by Cairns Marine were selectively donated to the reference collection of AMS and CAS. In some instances, photographs of live, unretained specimens were taken. These are herein included as photographic records in the event where specimens were unavailable for donation.

Distributional data for species were taken from the primary literature and cited where relevant, and from the following secondary data sources: the Australian Faunal Directory (AFD) (ABRS, 2009; https://biodiversity.org.au/afd/home), the Atlas of Living Australia (ALA) (http://www.ala.org.au), and the Fishes of Australia (FOA) (Bray and Gomon; http://fishesofaustralia.net.au). Global distribution categories (herein biogeographical affinities) assigned to each species in Table 1 are based on the categories assigned by Last et al. (2011) and Last et al. (2014), modified from Hoese et al. (2006). A category of 'unknown-taxonomic uncertainty' was assigned for any species that could not be reliably identified to minimise incorrect assignment of faunal affinity.

In the following annotated species account and in Table 1, the following abbreviations are used. CSMP denotes new records for the Coral Sea Marine Park. AU denotes new records for Australia and its remote territories. New regional records are accompanied by superscripted letters S, G, and F denoting new species, genus, and family records, respectively. Several species detailed below were previously only known from the Northern Hemisphere, and with the new CSMP records now have geographical distributions that are anti-tropical. These are annotated with SH, denoting new Southern Hemisphere records. Species that are known from verifiable, museum-vouchered material from the CSMP are denoted with V.

Several species in the annotated checklist below were previously known from photographs or anecdotal records taken from the CSMP with few or no vouchered material. We take the opportunity here to include updated accounts for those species where new voucher material is available but denote them with a [*] symbol to indicate that they are not strictly new records for the CSMP.

Annotated list of species

Family AULOPIDAE

Hime sp. A [CSMP ^{S}][AU^{S}]

Figure 2

An undetermined species of *Hime* was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 368 m in Lihou Reef, CSMP. Three species are known from Australian waters, viz. *Hime diactithrix* (Prokofiev 2008) from northwestern Western Australia, and *H. curtirostris* (Thomson 1967) and *H. pyrhistion* (Gomon et al. 2013) from eastern Australia. The CSMP individual differs from *H. diactithrix* and *H. curtirostris* based on differences in dorsal fin profile (Gomon and Struthers 2015), appearing more similar to *H. pyrhistion*, and *H. capitonis* (Gomon and Struthers 2015) from New Caledonia and

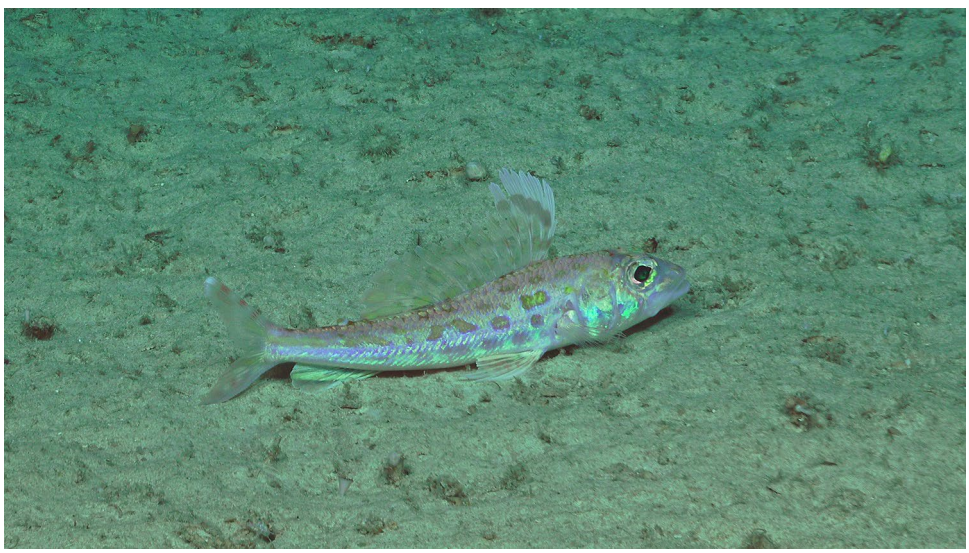

Fig. 2 *Hime* sp. A, ROV image taken at 368 m, Lihou Reef, Coral Sea, Australia. Photograph courtesy of the Schmidt Ocean Institute

Vanuatu instead. Given the absence of voucher material and the possibility of the CSMP individual representing either *H. capitonis* or an undescribed species, we refrain from a definitive identification beyond genus.

Family OPHIDIIDAE

***Neobythites* sp. A [CSMP^{S}] [AU^{S}]**

Figure 3

An undetermined species of *Neobythites* was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 525 m in Lihou Reef, CSMP. The species differs from all known species of *Neobythites* in having a silvery-white body with a series of dark brown vertical bands. The spaces between each band are interspersed with a much shorter, almost spot-like bar. Head with a dark brown lateral band from the edge of the opercle, continuing through the orbit and past the snout to the other side of the head. Predorsal region and nape patterned with dark brown sinuous, anastomosed stripes.

Family GOBIIDAE

***Obliquogobius* cf *trifasciatus* [CSMP^{S}]**

Figure 4

Fig. 3 *Neobythites* sp. A, ROV image taken at 525 m, Lihou Reef, Coral Sea, Australia. Photograph courtesy of the Schmidt Ocean Institute

Fig. 4 *Obliquogobius* cf *trifasciatus*, ROV image taken at 280 m, Lihou Reef, Coral Sea, Australia. Photograph courtesy of the Schmidt Ocean Institute

An undetermined species of gobiid belonging to the genus *Obliquogobius* was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 280 m in Lihou Reef, CSMP. The individual from the CSMP is superficially similar to *O. trifasciatus* (Fujiwara and Shibukawa 2023) from the Ryukyu Islands, southern Japan, but differs in some aspects of live colouration, such as intensity and positioning of the vertical body bands. One specimen of *Obliquogobius* is known from Queensland (CSIRO H 9172–13; 192 m). The CSIRO specimen agrees with topotypical *O. trifasciatus* based on fresh colouration details, but specimen vouchers from the Coral Sea are needed to reconcile these differences.

***Tryssogobius* sp. A [CSMP^{G,S}] [AU^{G,S}]**

Figure 5

A pair of an undetermined species of gobiid belonging to the genus *Tryssogobius* was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 109 m in the Tregrosse Reefs. The CSMP individuals most closely resemble *T. nigrolineatus* (Randall 2006) in having a black midlateral stripe across the body. However, in *T. nigrolineatus*, the stripe originates from behind the eye and is only weakly developed, whereas in the CSMP specimens, the stripe appears to originate behind the pectoral fin and is more prominently

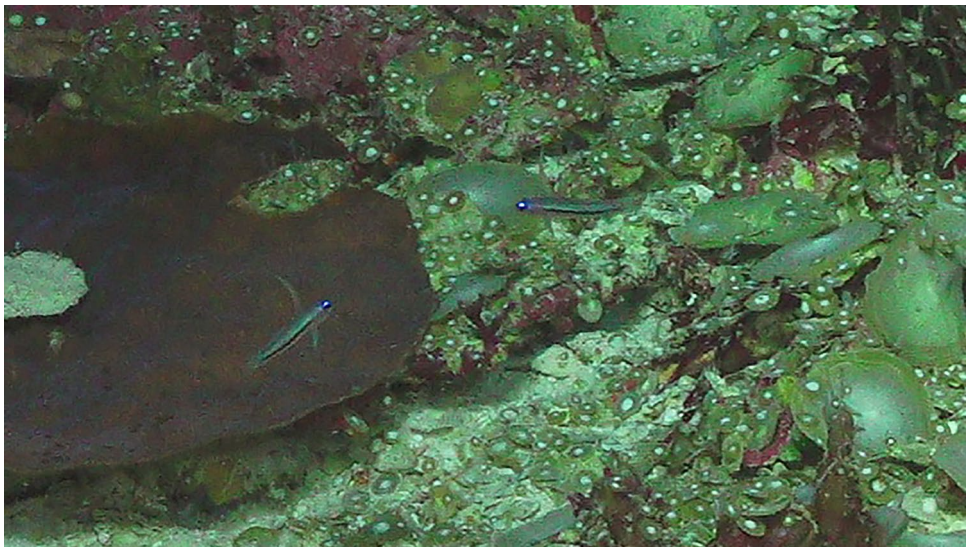

Fig. 5 *Tryssogobius* sp. A, ROV image taken at 109 m, Tregrosse Reefs, Coral Sea, Australia. Photograph courtesy of the Schmidt Ocean Institute

Fig. 6 *Centrodraco* cf *nakaboi*, ROV image taken at 603 m, Magdelaine Cays, Coral Sea, Australia. Photograph courtesy of the Schmidt Ocean Institute

marked. The presence of *Tryssogobius* in the CSMP represents a new genus record for the CSMP and Australia.

Family DRACONETTIDAE

***Centrodraco* cf *nakaboi* [CSMP^{G,S}] [AU^{S}]**

Figure 6

An undetermined species of draconettid belonging to the genus *Centrodraco* was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 603 m in the Magdelaine Cays. The specimen most closely resembles *Centrodraco nakaboi* (Fricke 1992) with widely spaced reddish-brown saddles. Fricke (1992) noted differences between the Southeast Pacific (holotype) and Northwest Pacific specimens (paratypes), and Roberts et al. (2015) noted additional colour differences in a New Zealand specimen from the Southwest Pacific. A similar looking fish to the CSMP individual was also filmed during a separate 2020 RV *Falkor* expedition off the eastern coast of the Cape York Peninsula, about 80 km east of Cape Weymouth at a depth of 478 m. Given the potential taxonomic uncertainties pertaining to this species, and in the absence of vouchered material, we refrain from providing a definitive identification of the CSMP specimen. Nonetheless, the presence of *Centrodraco* represents a new genus record for the CSMP.

Family GEMPYLIDAE

Epinnula rex Ho, Motomura, Hata, and Chiang 2017 **[CSMP^{G,S}] [AU^{G,S}]**

Figure 7

One individual was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 561 m in the Magdelaine Cays, CSMP. Ho et al. (2017) reviewed the gempylid genus *Epinnula*, restricting *E. magistralis* to the western Atlantic Ocean and elevating the Pacific Ocean population as a separate species, *E. pacifica*. *Epinnula pacifica* has since been given a new replacement name, *E. rex*, as a consequence of homonymy with *Epinnula orientalis pacifica* (now *Neoepinnula orientalis*) (see Ho et al. (2022) for correspondence). Elsewhere in the Pacific, the species is known from Hawaii, Japan, Taiwan, and New Zealand (Stewart 2015; Ho et al. 2017). The species has also recently been reported from Guam (B. Tibbatts, pers. comm).

Family POMACENTRIDAE

Azurina brevirostris Pyle et al. 2008 **[CSMP^{G,S}] [V]**

Figure 8A

Material examined: **Flora Reef**, **Coral Sea**, **Australia** (AMS I.51310-001; AMS I.51310-002; AMS I.51450-003); **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.51459-004; QM I.40679)

Multiple individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition between 98 and 112 m in the Tregrosse Reefs, CSMP, and at 97 m in Lihou Reef, CSMP, respectively. The species has also been recorded by ROV during the Annual Reef Health Monitoring surveys (James Cook University and Parks Australia) in 2023 and 2024 at Marion Reef, Mellish Reef, Bougainville Reef, and the Diamond Islets, CSMP,

Fig. 7 *Epinnula rex*, ROV image taken at 561 m, Magdelaine Cays, Coral Sea, Australia. Photograph courtesy of the Schmidt Ocean Institute

between 50 and 98 m. The species is frequently encountered in loose, mixed species aggregations over *Halimeda* algal beds and steep reef slopes, in the former habitat with *Genicanthus melanospilos*, *G. watanabei*, *Pseudanthias engelhardi*, and *Cirrhilabrus roseafascia*, and in the latter habitat with *Chromis circumaurea*, *C. degruyi*, and *C. earina* (see below). Elsewhere in Australia the species has also been reported from Ashmore Reef, Western Australia, and the Timor Sea (Allen and Erdmann 2024). We report new vouchered material of this species collected at 140 m from Holmes Reef, CSMP, and between 130 and 135 m from Flora Reef, CSMP.

***Chromis* cf *bowesi* [CSMP^{S}] [AU^{S}] [V]**

Figure 8B

Material examined: **Holmes Reef, Coral Sea, Australia** (AMS I.51459-001; CAS-ICH248436)

Multiple individuals of an undetermined species of *Chromis* were photographed in deep mesophotic reefs of Holmes Reef, CSMP. Two specimens were collected at 142 m from Holmes Reef, CSMP, and vouchered at AMS and CAS. The specimens share similar meristic data as *Chromis bowesi* (Arango et al. 2019), as well as several aspects of live colouration, particularly in having five to six purplish-blue horizontal stripes, and in having a pale, indistinct vertical band on the body. The CSMP specimens, however, differ from

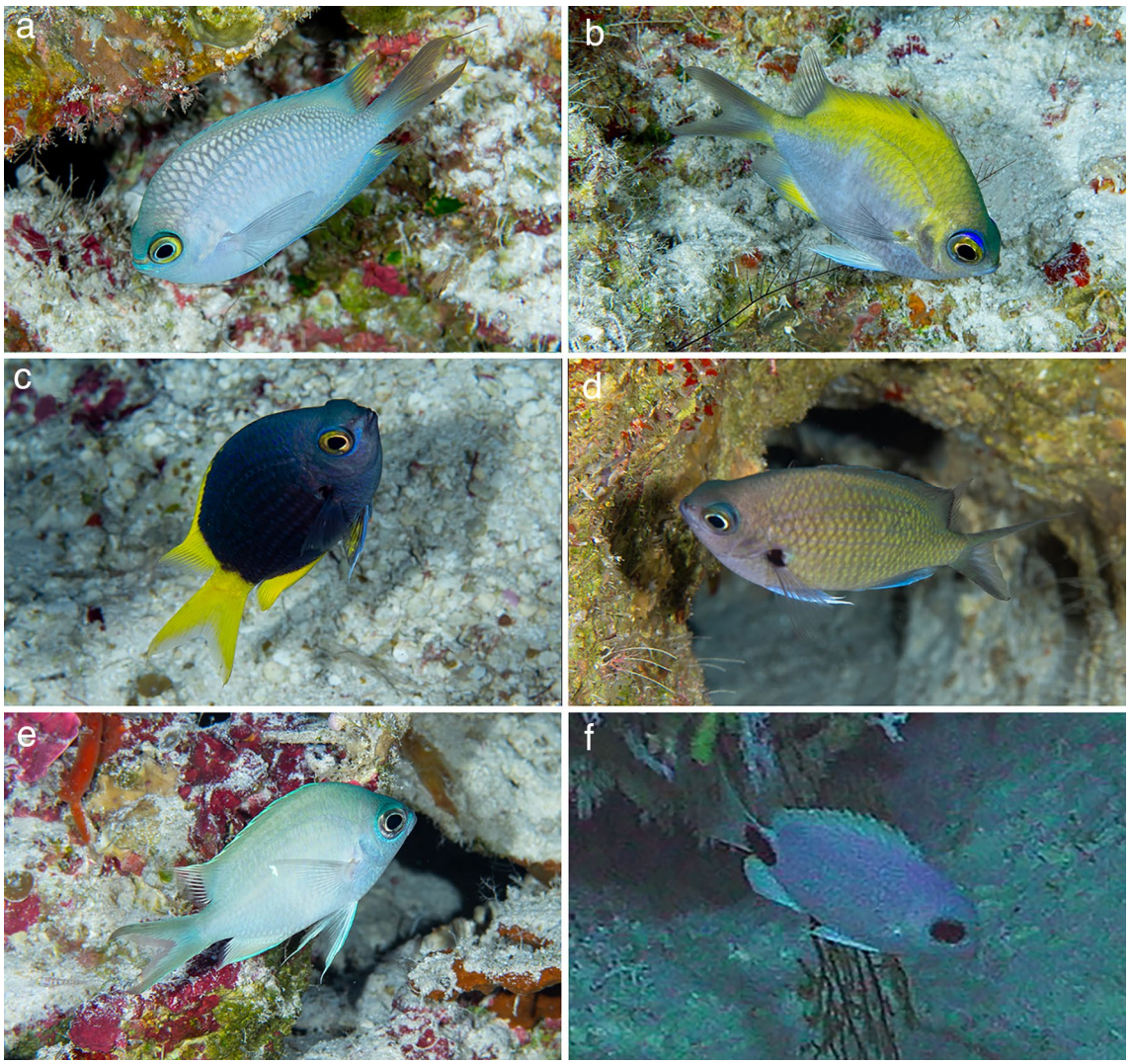

Fig. 8 **a** *Azurina brevirostris*, underwater photograph from 110 m, Flora Reef, Coral Sea, Australia; **b** *Chromis* cf *bowesi*, underwater photograph from 142 m, Holmes Reef, Coral Sea, Australia; **c** *Chromis circumaurea*, underwater photograph from 120 m, Flora Reef, Coral Sea, Australia; **d** *Chromis degruyi*, underwater photograph from 110 m, Flora Reef, Coral Sea, Australia; **e** *Chromis earina*, underwater photograph from 105 m, Flinders Reef, Coral Sea, Australia; **f** *Chromis* sp. A, ROV image taken at 204 m, Willis Islets, Coral Sea, Australia. Photographs **a**–**e** by Luiz Rocha; **f** courtesy of the Schmidt Ocean Institute

topotypical examples of *C. bowesi* in having the upper body yellowish green (versus silvery-grey). We exercise restraint in making a definitive species identification pending more taxonomic studies.

Chromis circumaurea Pyle et al. 2008 **[CSMP^{S}] [V]**

Figure 8C

Material examined: **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.50090-001); **Flora Reef**, **Coral Sea**, **Australia** (AMS I.51450-002)

Multiple individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at depths between 148 and 195 m in Moore Reefs, CSMP. The species is also known from Myrmidon Reef in the Great Barrier Reef based on BRUV footage taken at 115 m (Sih et al. 2017). We report new vouchered material of this species collected at 135 m from Holmes and Flora Reef, CSMP, respectively and underwater photographs taken at 120 m from Flora Reef respectively.

Chromis degruyi Pyle et al. 2008 **[CSMP^{S}] [AU^{S}]**

Figure 8D

Two individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 94 m and 118 m in Lihou Reef, CSMP. The species has also been photographed at 110 m from Flora reef, CSMP. These individuals agree well with the colour description and holotype of *C. degruyi* from Palau (Pyle et al. 2008), particularly in having a yellowish-brown ground colouration, a black spot on the upper pectoral-fin axil, and nine thin lavender-grey stripes on the body.

Chromis earina Pyle et al. 2008 **[CSMP^{S}] [AU^{S}]**

Figure 8E

One specimen was photographed at 105 m from Flinders Reef, CSMP. The photographed individual agrees well with the colouration description and holotype of *C. earina* from Palau (Pyle et al. 2008), particularly in having a pale green body with a small white spot situated mid-laterally below the 10th dorsal-fin spine and two scale rows below the lateral line (approximated in photographed specimen).

***Chromis* sp. A [CSMP^{S}]**

Figure 8F

Multiple individuals belonging to an undetermined species of *Chromis* were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition between 148 and 206 m in various localities in the CSMP, including Lihou Reef and the Willis Islets. The species is also known from a drowned reef approximately 10 km north-west of Myrmidon Reef in the central Great Barrier Reef based on BRUV footage taken at 155 m (Sih et al. 2017). The species bears superficial resemblance to *Chromis axillaris* (Bennett 1831) and *C. woodsi* (Bruner and Arnam 1979) in having a mostly white, pearlescent body with black markings on the caudal peduncle but appears to differ from the latter two in the shape of the caudal peduncle marking.

Family SERRANIDAE

***Chelidoperca* sp. A [CSMP^{S}] [AU^{S}]**

Figure 9

A single individual of an undetermined species most similar to *Chelidoperca* was photographed at 85 m from Flora Reef, CSMP, Australia. The species appears to be undescribed, as it has an estimated lateral-line scale count and transverse scale count between the lateral-line and middle dorsal-fin spines in excess of that known for *Chelidoperca* [33–46 and 3–5, respectively; see Lee et al. (2019), Matsunuma et al. (2024)]. The genus currently includes 20 valid species, 13 of which described only in the last decade, largely due to increased collecting efforts around deep-reef habitats. Allocation to the genus *Chelidoperca* should be regarded as provisional pending availability of specimen vouchers.

Family ANTHIADIDAE

Odontanthias borbonius Valenciennes 1828 **[CSMP^{G,S}] [AU^{S}] [V]**

Figure 10A

Material examined: **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.49570-001; AMS I.50038-001; AMS I.51196-001); **Flora Reef**, **Coral Sea**, **Australia** (AMS I.51455-003 [Fig. 10A]; CAS-ICH248433).

A species of *Odontanthias* readily separated from all other congeneric species in having large, irregularly shaped olive to yellow polygonal blotches. Multiple individuals of this species were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at depths between 122 and 130 m in Lihou Reef, CSMP. We report new

Fig. 9 *Chelidoperca* sp. A, underwater photograph taken from 85 m, Flora Reef, Coral Sea, Australia. Photograph by Luiz Rocha

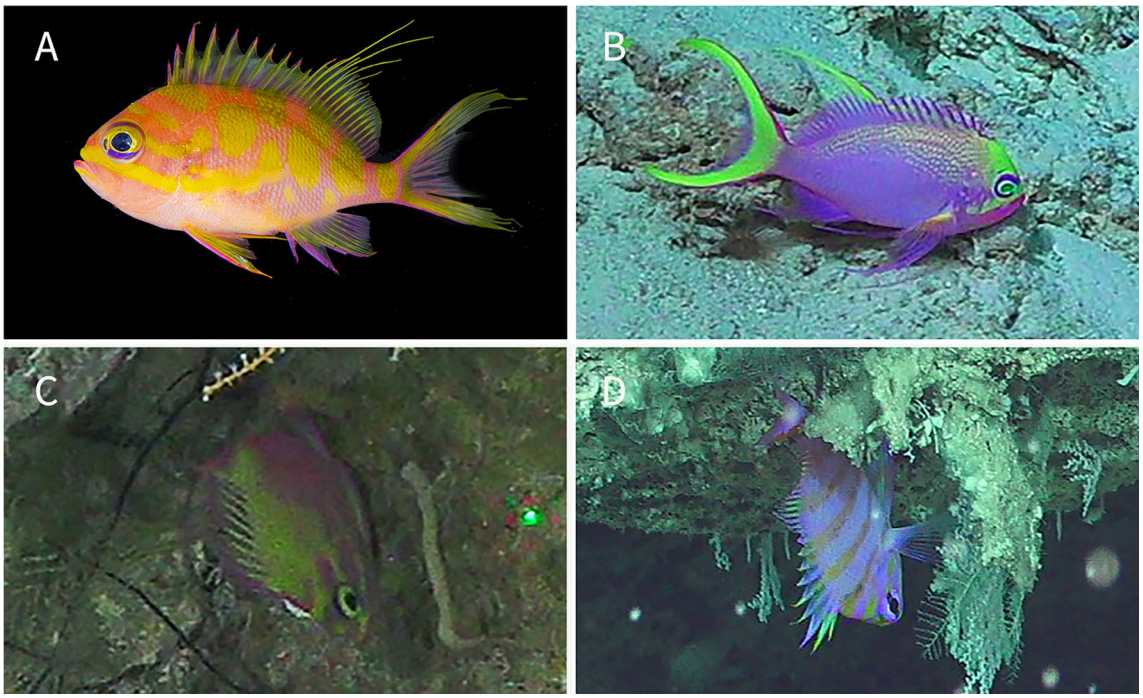

Fig. 10 **a** *Odontanthias borbonius*, AMS I.51455–003, 63.3 mm SL, freshly dead specimen from 146 m, Flora Reef, Coral Sea, Australia; **b** *Odontanthias tapui*, ROV image taken at 355 m, Osprey Reef, Coral Sea, Australia; **c** *Odontanthias wassi*, ROV image taken at 180 m, Magdelaine Cays, Coral Sea, Australia; **d** *Odontanthias* sp. A, ROV image taken at 326 m, Magdelaine Cays, Coral Sea, Australia. Photographs **a** by Yi-Kai Tea; **b–d** courtesy of the Schmidt Ocean Institute

vouchered material collected between 135 and 145 m from Holmes Reef, and at 146 m from Flora Reef, CSMP. A widespread species ranging from the east African coast in the western Indian Ocean to the Western and Central Pacific Ocean (Kuiter 2004a; Randall and Heemstra 2006).

Odontanthias tapui Randall et al. 1979 **[CSMP^{S}] [AU^{S}]**

Figure 10B

Similar in appearance to *Odontanthias katayamai* (Randall et al. 1979) and *O. chrysostictus* (Günther 1872), but separable from both and all other congeneric species in having in combination a yellow, lunate caudal fin with long, rounded lobes, and yellow pigmentation on the dorsal fin restricted only to the filamentous prolongation of the segmented rays. Multiple individuals of this species were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' and the 2020 RV *Falkor* 'Seamounts, Canyons and Reefs of the Coral Sea' expeditions at depths between 220 and 538 m in various localities in the CSMP, including Osprey Reef, Holmes Reef, Willis Islet, Diamond Islets, and the Magdelaine Cays. The species was also filmed in situ during the 2017 NOAA *Okeanos Explorer* voyage to American Samoa, where it was common below 200 m. Elsewhere in the southern Pacific, the species has been reported from Tonga, the Cook Islands, the Society Islands, the Tuamotu Archipelago, Moorea, and the Austral Islands in French Polynesia (Siu et al. 2017).

Odontanthias wassi Randall and Heemstra 2006 **[CSMP^{S}] [AU^{S}] [V]**

Figure 10C

Material examined: **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.49964-001)

Readily separated from congeneric species in having a yellowish green upper body, except for caudal peduncle and lower body above anal fin, where it is bright pink. Base of segmented portion of dorsal fin and filamentous segmented fin rays bright yellow. Multiple individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition between 120 and 190 m in various localities in the CSMP, including Moore Reefs, Lihou Reef, and the Magdelaine Cays. We report new vouchered material collected at 140 m from Holmes Reef, CSMP (AMS I.49964-001). The species was previously known only from the holotype from Ofu Island, American Samoa (Randall and Heemstra 2006).

***Odontanthias* sp. A [CSMP^{S}] [AU^{S}]**

Figure 10D

Multiple individuals of a bright purple fish with five or six vertically oriented yellow bands belonging to an undetermined species of anthiadid were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition between 322 and 515 m in various localities in the CSMP, including the Magdelaine Cays and Lihou Reef. The species bears at least superficial resemblance to several anthiadin genera such as *Odontanthias* and *Sacura* in having filamentous prolongations of the anterior segmented dorsal-fin rays. The coloration pattern, however, does not agree with any of the known species. A similar, and possibly conspecific fish was also filmed in situ on several occasions during the 2016 NOAA *Okeanos Explorer* voyage to the Mariana Islands and the 2017 NOAA *Okeanos Explorer* voyage to American Samoa. Given the lack of taxonomic resolution surrounding members of the Anthiadidae (Pogonoski and Gill 2021), the probable non-monophyly for the aforementioned anthiadin genera (Gill and Russell 2019; Zajonz et al. 2020), and the lack of specimen vouchers, generic allocation of this likely undescribed species to *Odontanthias* should be regarded as provisional.

Plectranthias pelicieri Randall and Shimizu 1994 **[CSMP^{S}] [AU^{S}]**

Figure 11A

A single individual of a *Plectranthias* species was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 133 m in the Tregrosse Reefs, CSMP. Unfortunately, only head-on imagery was recorded. Nonetheless, the head and anterior body coloration suggests it's either *P. pelicieri* or *P. cruentus* Gill and Roberts (2020), both of which are known to occur in adjacent waters. Of these, we favour identification as *P. pelicieri* based on the distinct red spots on the anal fin (versus indistinct in *P. cruentus*) and presence of a dorsal and ventral red spot on the caudal peduncle (versus red bar in *P. cruentus*). Specimens are needed to verify this record.

Plectranthias randalli Fourmanoir and Rivaton 1980 **[CSMP^{S}] [AU^{S}]**

Figure 11B

A species of *Plectranthias* differing from all congeneric species in having a silvery-white ground colouration with three broad, oblique brown bands. One individual was filmed during the 2020 RV *Falkor* 'Seamounts, Canyons and Reefs of the Coral Sea' expedition at 309 m in the Tregrosse Reefs, CSMP. Its occurrence in the CSMP is unsurprising, given its

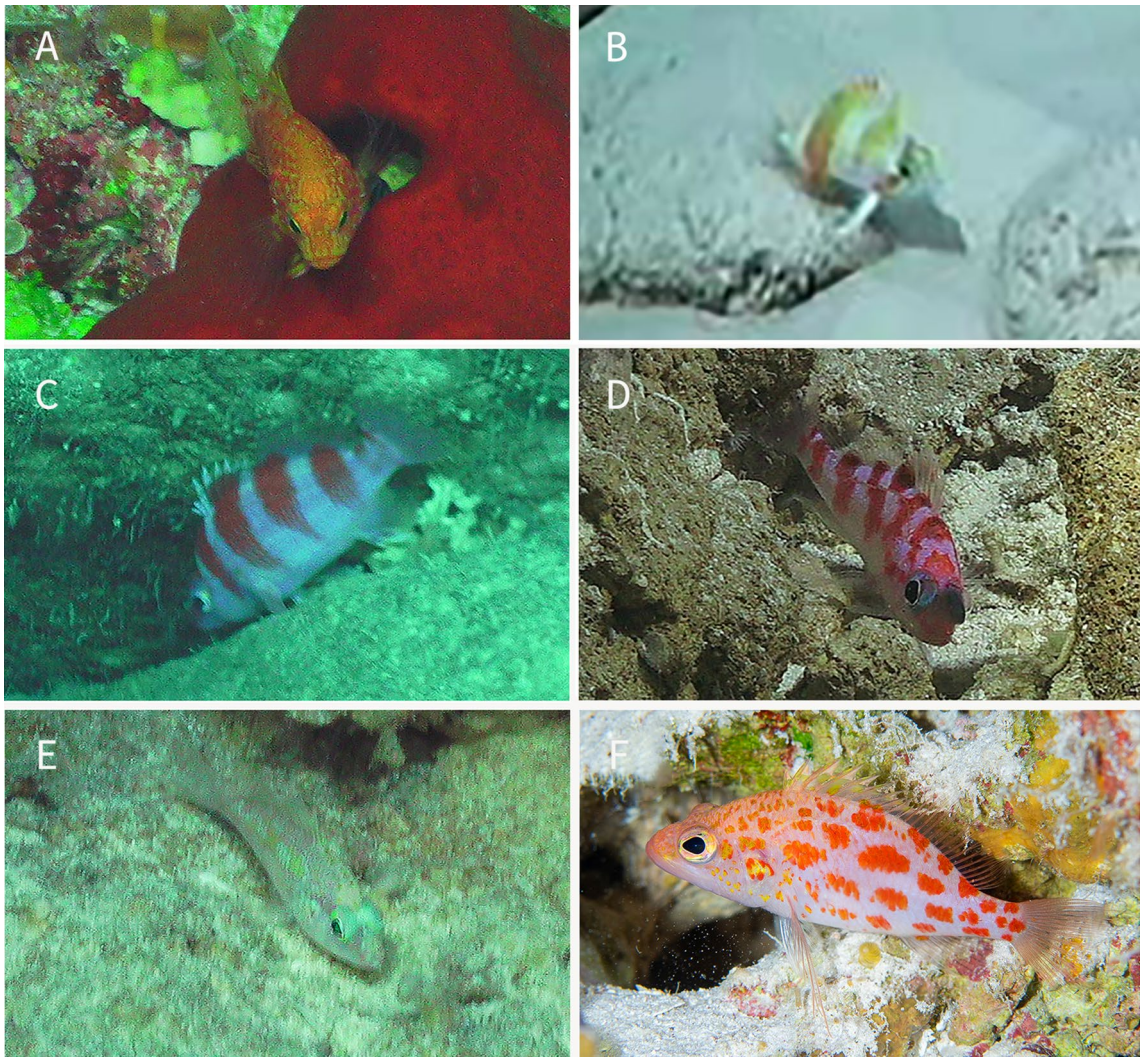

Fig. 11 **a** *Plectranthias pelicieri*, ROV image taken at 133 m, Tregrosse Reefs, Coral Sea, Australia; **b** *Plectranthias randalli*, ROV image taken at 309 m, Tregrosse Reefs, Coral Sea, Australia; **c** *Plectranthias* sp. A, ROV image taken at 490 m, Magdelaine Cays, Coral Sea, Australia; **d** *Plectranthias* sp. B, ROV image taken at 461 m, Lihou Reef, Coral Sea, Australia; **e** *Plectranthias* sp. C, ROV image taken at 303 m, Lihou Reef, Coral Sea, Australia; **f** *Plectranthias* sp. D, underwater photograph from 135 m, Flora Reef, Coral Sea, Australia. Photographs **a**–**e** courtesy of the Schmidt Ocean Institute; **f** by Luiz Rocha

type locality of Chesterfield Bank, eastern Coral Sea. Elsewhere in the Pacific, the species is also known from Taiwan (Lin et al. 1994) and Bitung, North Sulawesi (Peristiwady et al. 2014).

Plectranthias sp. A [CSMP^{S}] [AU^{S}]

Figure 11C

One individual of an undetermined species of anthiadid likely belonging to the genus *Plectranthias* was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at a depth of 490 m in the Magdelaine Cays, CSMP. The species differs from all known congeneric species of *Plectranthias* with documented live coloration details, but specimen vouchers are needed to reconcile its identity with other known deepwater species with undocumented live coloration. The colour pattern is also suggestive of the temperate to subtropical genus *Hypoplectrodes*.

Plectranthias sp. B [CSMP^{S}] [AU^{S}]

Figure 11D

Multiple individuals of an undetermined species of *Plectranthias* were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at depths between 456 and 532 m in various localities in the CSMP, including the

Magdelaine Cays, Lihou Reef, and the Diamond Islets. The species differs from all known congeneric species of *Plectranthias* with documented live coloration details, but specimen vouchers are needed to reconcile its identity with other known deepwater species with undocumented live coloration and to ascertain if they represent juveniles of known species.

***Plectranthias* sp. C [CSMP^{S}] [AU^{S}]**

Figure 11E

One individual of an undetermined species of *Plectranthias* was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at a depth of 303 m in Lihou Reef, CSMP. The species differs from all known congeneric species of *Plectranthias* with documented live coloration details, but specimen vouchers are needed to reconcile its identity with other known deepwater species with undocumented live coloration and to ascertain if they represent juveniles of known species.

***Plectranthias* sp. D [CSMP^{S}] [AU^{S}] [V]**

Figure 11F

Material examined: **Flora Reef**, **Coral Sea**, **Australia** (AMS I.51456-001)

Multiple individuals of an undetermined species of *Plectranthias* were photographed in deep mesophotic reefs of Flora Reef, CSMP. One specimen was collected at 135 m from Flora Reef, CSMP, and vouchered at AMS.

Pseudanthias flavicauda Randall and Pyle 2001 **[V] [*]**

Figure 12

Material examined: **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.49960-001); **Flora Reef**, **Coral Sea**, **Australia** (AMS I.50099-006; AMS I.50103-002; AMS I.50103-003; AMS I.50103-004; AMS I.50106-001; AMS I.50106-002; AMS I.50106-003; AMS I.50107-001)

Galbraith et al. (2024) reported this species as a new record for the CSMP, based on ROV footage taken at 92 m in Osprey, Lihou, and Bougainville Reefs. We report new vouchered material of this species collected at 80 m from Holmes Reef and between 30 and 80 m from Flora Reef, CSMP. The species has also been photographed at 85 m from Flora Reef, CSMP.

***Pseudanthias* cf *rubrolineatus* [CSMP^{S}] [V]**

Figure 13

Material examined: **Diamond Islets**, **Coral Sea**, **Australia** (AMS I.51095-001; AMS I.51096-001; AMS I.51096-002; AMS I.51097-001; AMS I.51907-002)

Fig. 12 *Pseudanthias flavicauda*, underwater photograph from 85 m, Flora Reef, Coral Sea, Australia. Photograph by Luiz Rocha

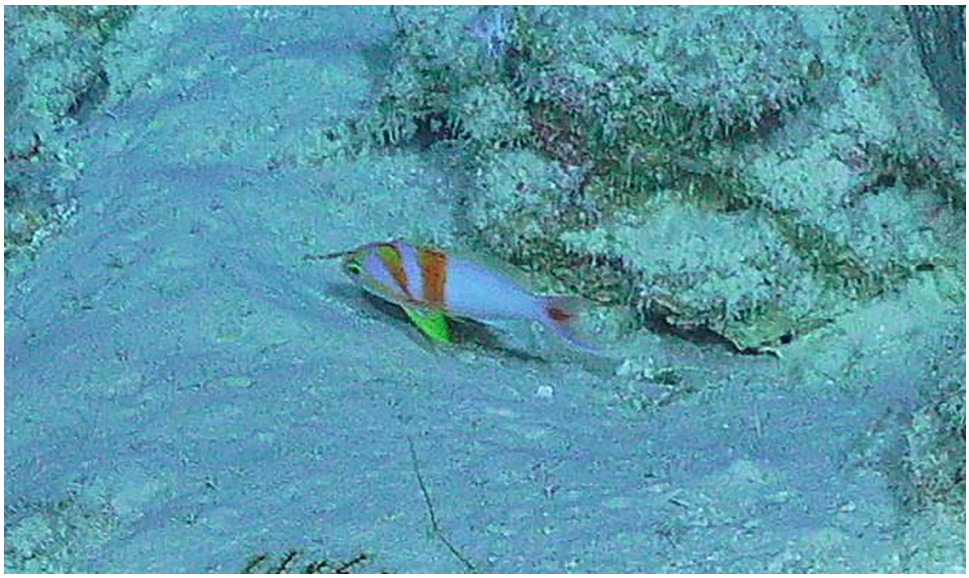

Fig. 13 *Pseudanthias* cf *rubrolineatus*, ROV image taken at 205 m, Willis Islets, Coral Sea, Australia. Photograph courtesy of the Schmidt Ocean Institute

An undetermined species of anthiadid closely resembling *Pseudanthias rubrolineatus* (Fourmanoir and Rivaton 1979) in nuptial coloration (see Kuiter 2004a) was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at a depth of 205 m in the Willis Islets, CSMP. Another individual that appears to be the same species was filmed at 109 m in Lihou Reef, CSMP. Five specimens, belonging to the same species, were collected at 104 m during deep mesophotic reef surveys of the Diamond Islets.

The specimens further resemble *P. rubrolineatus* in most meristic and morphometric details, but the female differs from *P. rubrolineatus* in lacking a curved red stripe on the upper body. The taxonomy of the Coral Sea specimens is currently under study.

Pyronotanthias parvirostris Randall and Lubbock 1981 **[V] [*]**

Figure 14

Fig. 14 *Pyronotanthias parvirostris*, AMS I.51385-001, 39.1 mm SL, freshly dead specimen from 46 m, Flora Reef, Coral Sea, Australia. Photograph by Fenton Walsh

Fig. 15 *Tosanoides bennetti*, AMS I.51456-003, 50.0 mm SL, freshly dead specimen from 152 m, Flora Reef, Coral Sea, Australia. Photograph by Yi-Kai Tea

Material examined: **Flora Reef**, **Coral Sea**, **Australia** (AMS I.51385-001 [Fig. 14]; AMS I.51385-003; AMS I.51385-005; AMS I.51385-007; AMS I.51385-009; AMS I.51385-011; AMS I.51385-013; AMS I.51385-021; AMS I.51385-023)

In their guide to reef fishes of the East Indies, Allen and Erdmann (2012) included the Coral Sea as a locality record for the species, though without specimen or photographic data. We report new vouchered material of this species collected at 46 m from Flora Reef.

Tosanoides bennetti Allen and Walsh 2019 **[V] [*]**

Figure 15

Material examined: **Flora Reef**, **Coral Sea**, **Australia** (AMS I.51456-003 [Fig. 15])

In Australia, the species was known previously only from the holotype and five paratypes collected between 140 and 150 m from Holmes Reef, CSMP. Multiple individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition between 124 and 215 m in various localities in the CSMP, including the Willis Islets, the Magdelaine Cays, and Lihou Reef. A new specimen was recently collected at 152 m from Flora Reef. The species is also recently known from New Caledonia, based on trawled specimens (NTUM 13758) and underwater photographs (P. Plantard, pers. comm).

Family LIOPROPOMATIDAE

Liopropoma japonicum Döderlein 1883 **[CSMP^{S}] [AU^{S}] [SH^{S}]**

Figure 16

A species of *Liopropoma* differing from all congeneric species in having a prominent red, comb-shaped lateral stripe running horizontally from the snout tip, through the orbit to the upper caudal peduncle, and a large red spot on the caudal peduncle. One individual of this species was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 286 m in Lihou Reef, CSMP. Previously known only from records in the Northern Hemisphere including Taiwan, Japan and Korea (Randall and Taylor 1988; Senou 1993; Kim et al. 2004).

Family SCORPAENIDAE

Rhinopias argoliba Eschmeyer, Hirosaki, and Abe 1973 **[CSMP^{S}] [AU^{S}] [SH^{S}]**

Figure 17

Fig. 16 *Liopropoma japonicum*, ROV image taken at 286 m, Lihou Reef, Coral Sea, Australia. Photograph courtesy of the Schmidt Ocean Institute

Fig. 17 *Rhinopias argoliba*, ROV image taken at 195 m, Tregrosse Reefs, Coral Sea, Australia. Photograph courtesy of the Schmidt Ocean Institute

A species of *Rhinopias* characterised by relatively few dermal ornamentations and skin flaps, absence of tentacular appendages on the lower jaw, and in having a prominent white lachrymose pattern below the eye. One individual of this species was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 195 m in the Tregrosse Reefs, CSMP. The species was previously known only from a handful of records in Sagami Bay, southern Japan, the Northern Hemisphere (Eschmeyer et al. 1973; Senou et al. 2006).

Family LABRIDAE

Bodianus masudai Araga and Yoshino 1975 **[CSMP^{S}]**

Figure 18A

A species of *Bodianus* bearing similarities to *Bodianus neoperculatis* (Gomon 2006), *B. sepiacaudus* (Gomon 2006), and *B. bennetti* (Gomon and Walsh 2016), but differentiated on the basis of its deeper body, red, unmarked

Fig. 18 **A** *Bodianus masudai*, unretained aquarium specimen from Holmes Reef, Coral Sea, Australia; **B** *Bodianus paraleucosticticus*, underwater photograph from 112 m, Flora Reef, Coral Sea, Australia; **C** *Bodianus thoracotaeniatus*, ROV image taken at 373 m, Holmes Reef, Coral Sea, Australia; **D** *Cirrhilabrus beauperryi*, AMS I.51354-001, 89.5 mm SL, freshly dead specimen from 12 m, Holmes Reef, Coral Sea, Australia; **E** *Cirrhilabrus roseafascia* underwater photograph from 120 m, Holmes Reef, Coral Sea, Australia; **F** *Decodon* sp. A, ROV image taken at 207 m, Willis Islets, Coral Sea, Australia; **G** *Halichoeres melasmapomus*, AMS I.51354-002, 90.5 mm SL, freshly dead specimen from 12 m, Holmes Reef, Coral Sea, Australia; **H** *Oxycheilinus arenatus*, underwater photograph from 68 m, Flinders Reef, Coral Sea, Australia; **I** *Paracheilinus filamentosus*, AMS I.51426–002, 30.2 mm SL, freshly dead specimen from 45 m, Holmes Reef, Coral Sea, Australia. Photographs **A**, **D**, **G**, **I** by Fenton Walsh; **B**, **E**, **H** by Luiz Rocha; and **C**, **F** courtesy of the Schmidt Ocean Institute

caudal fin, and in having fewer red body stripes. In Australia, the species is known from Myrmidon Reef in the Great Barrier Reef based on BRUV footage taken at 115–155 m (Sih et al. 2017), and from 142 m, Holmes Reef, CSMP, based on unretained specimens collected for the aquarium trade. *Bodianus masudai* has an anti-tropical distribution, with records from southern Japan to Taiwan in the Northern Hemisphere, and New Caledonia and Norfolk Island in the Southern Hemisphere (Gomon 2006).

Bodianus paraleucosticticus Gomon 2006 **[V] [*]**

Figure 18B

Material examined: **Flora Reef**, **Coral Sea**, **Australia** (AMS I.51352-001; AMS I.51353-001; AMS I.51457-001).

Replaces the closely related *Bodianus leucosticticus* in the Southern Hemisphere, and readily identified in having four horizontal, pinkish orange stripes running in parallel along the body, and a prominent black spot on the anteriormost 1–4 dorsal-fin spines. Galbraith et al. (2024) reported this species as a new record for the CSMP, based on ROV footage taken at depths between 70 and 90 m in Osprey Reef and Lihou Reef. The species was also filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 134 m in Lihou Reef. We report new vouchered material of this species collected between 102 and 142 m from Flora Reef, CSMP, as well as in situ photographs taken at 112 m from Flora Reef, CSMP.

Bodianus thoracotaeniatus Yamamoto 1982 **[CSMP^{S}] [AU^{S}] [SH^{S}]**

Figure 18C

A poorly known species of deepwater *Bodianus* differing from all congeneric species in having a red upper body

bearing a horizontal yellow stripe, and the distalmost tips of the interspinous membranes black. One individual was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 373 m in Holmes Reef, CSMP. The species is anti-equatorial and is known from very few records in the Northern Hemisphere, mostly from Taiwan and the Kyushu Ridge. The species was also filmed in high definition at a depth of 400 m during the 2016 NOAA *Okeanos Explorer* voyage to the Mariana Islands. Both individuals filmed from the Coral Sea and the Mariana Islands possess a black dorsal-fin spot on the anterior segmented portion and are similar in colouration to a small 13 cm specimen from Japan (Kato 2016). The spot is not present in larger specimens [e.g. 19.5 cm specimen from Taiwan in Kuiter (2010)].

Cirrhilabrus beauperryi Allen et al. 2008 **[CSMP^{S}] [AU^{S}] [V]**

Figure 18D

Material examined: **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.51354-001 [Fig. 18D])

Replaces the similar and closely related *Cirrhilabrus punctatus* (Randall and Kuiter 1989) in Papua New Guinea and the Solomon Islands. Easily distinguished from *C. punctatus* in having a greenish-ochre dorsum and a purplish-blue lower body. We report new vouchered material of this species collected at 12 m from Holmes Reef, CSMP. The species is apparently poorly known from Australia, with only one other photographic record taken from Opal Reef in the Great Barrier Reef (iNaturalist; https://www.inaturalist.org/observations/187920694).

Cirrhilabrus roseafascia Randall and Lubbock 1982 **[V] [*]**

Figure 18E

Material examined: **Flora Reef**, **Coral Sea**, **Australia** (AMS I.49488-002; AMS I.49512-001); **Flinders Reef**, **Coral Sea**, **Australia** (AMS I.51454-003)

Readily identified by its pink body colouration and long, lanceolate caudal fin. Galbraith et al. (2024) reported this species as a new record for the CSMP, based on ROV footage taken at 94 m in Osprey Reef and the Diamond Islets. Multiple individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' and the 2020 RV *Falkor* 'Seamounts, Canyons and Reefs of the Coral Sea' expeditions between 91 and 187 m in various localities in the CSMP, including Lihou Reef, Tregrosse Reefs, and the Diamond Islets. The species has also been reported from the area around Myrmidon Reef in the Great Barrier Reef based on BRUV footage taken at 85–155 m (Sih et al. 2017). We report new vouchered material collected between 95 and 145 m from Holmes Reef, CSMP, at 135 m from Flinders Reef, CSMP. The depth records presented herein are the deepest for any known species of *Cirrhilabrus*.

***Decodon* sp. A [CSMP^{S}] [AU^{S}] [V]**

Figure 18F

Material examined: **Jewell Reef**, **Great Barrier Reef**, **Australia** (AMS I.49959-001)

One individual of an undetermined labrid likely belonging to the genus *Decodon* was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 207 m in the Willis Islets, CSMP. Only one species, *D. pacificus* (Kamohara 1952) is known to occur in Australia and the southwestern Pacific Ocean. The colouration of the individual filmed from the CSMP does not agree with that of *D. pacificus*, particularly in possessing a series of prominent, vertical bands on the upper body and in having a red margin on the outer edge of the caudal fin. We report new vouchered material of this species collected at 150 m from Jewell Reef, in the Great Barrier Reef.

Halichoeres melasmapomus Randall 1981 **[V] [*]**

Figure 18G

Material examined: **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.51354-002 [Fig. 18G])

Galbraith et al. (2024) reported this species as a new depth record for the CSMP, based on BRUV footage taken at 65 m in Wreck Reef. Elsewhere in Australia the species has also been reported from the inshore Kimberley, Rowley Shoals and Hibernia Reef in the Ashmore and Cartier Islands, Western Australia (Moore et al. 2020), the Cocos (Keeling) Islands, Christmas Island, and the northern Great Barrier Reef. We report new vouchered material of this species collected at 12 m from Holmes Reef, CSMP.

Oxycheilinus arenatus Valenciennes 1840 **[CSMP^{S}] [AU^{S}]**

Figure 18H

One individual was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 176 m in Lihou Reef, CSMP. Multiple individuals were also recorded by ROV during the 2023 and 2024 annual Coral Reef Health Monitoring surveys (James Cook University,

Fig. 19 *Pseudojuloides mesostigma*, unretained aquarium specimen from 65 m, Holmes Reef, Coral Sea, Australia. Photograph by Yi-Kai Tea

Parks Australia) at Holmes Reef, Mellish Reef and the Diamond Islets, CSMP, at depths between 45 and 91 m. The species has also been photographed at 68 m from Flinders Reef, CSMP.

Paracheilinus filamentosus Allen 1974 **[CSMP^{S}] [V]**

Figure 18I

Material examined: **Flora Reef**, **Coral Sea**, **Australia** (AMS I.51426-001; AMS I.51426-002 [Fig. 18I]).

Known primarily from Papua New Guinea and the Solomon Islands. We report new vouchered material of this species collected at 45 m from Holmes Reef, CSMP. The species is poorly known from Australia, with only one other record of a specimen collected from Lizard Island in the Great Barrier Reef (Tea and Walsh 2023).

Pseudojuloides mesostigma Randall and Randall 1981 **[CSMP^{S}] [AU^{S}] [V]**

Figure 19

Material examined: **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.49961-001 [Fig. 19]; AMS I.49961-002; AMS I.49963-001; AMS I.49963-002; AMS I.49972-001; AMS I.49972-002; AMS I.49973-001)

A distinctive species of deepwater *Pseudojuloides* readily distinguished from congeners in having a black caudal fin and an oblique black saddle over the upper body and middle portion of the dorsal fin. This species cannot be confused with any other species of *Pseudojuloides*. We report new vouchered material of this species collected at 65 m from Holmes Reef, CSMP.

***Suezichthys* sp. A [CSMP^{G,S}] [V?]**

Figure 20A

Material examined: **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.50117-001 [Fig. 20B])

An unidentified species of *Suezichthys* was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 187 m in Lihou Reef, CSMP (Fig. 20A). The individual appears to be either a juvenile or young female, notable by the large black ocellus on the distal portion of the caudal peduncle. The genus is poorly known from the Coral Sea, with only a handful of species recorded from adjacent waters around New Caledonia and southern Queensland, namely *S. devisi* (Whitley 1941) and *S. arquatus* (Russell 1985). The specimen from Lihou Reef, CSMP, appears most similar to *S. arquatus* on the basis of IP colouration, particularly in having pinstripes on the upper body, an additional, smaller black ocellus on the posterior dorsal fin, and in having what appears to be black spots on the head.

We report new vouchered material of an unidentified species of *Suezichthys* collected at 145 m from Holmes Reef, CSMP (Fig. 20B). The specimen from Holmes Reef is similar to

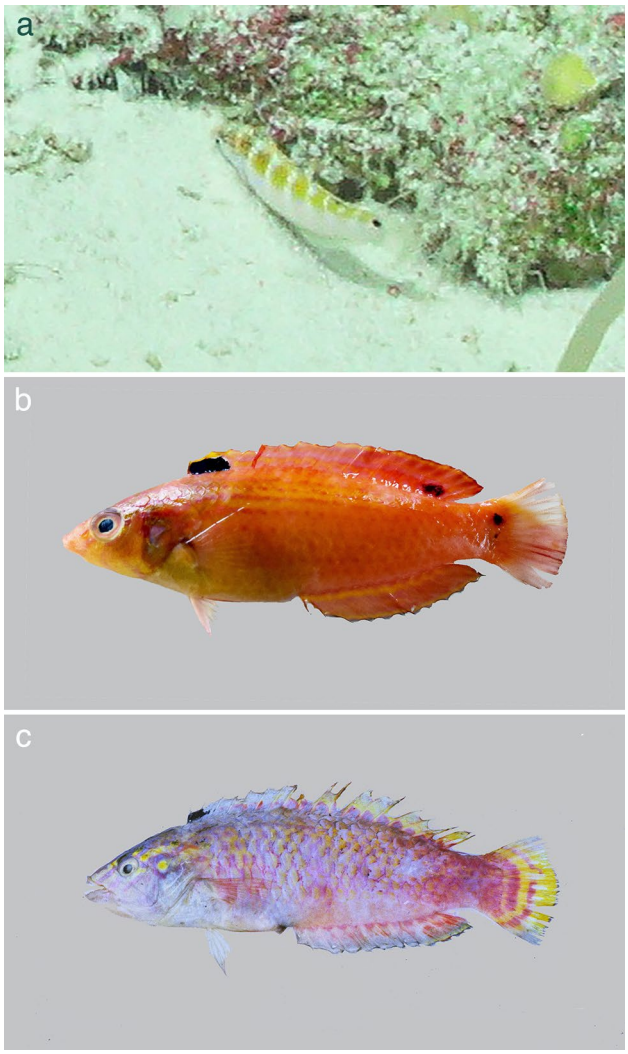

Fig. 20 **A** *Suezichthys* sp. A, ROV image taken at 187 m, Lihou Reef, Coral Sea, Australia; **B** *Suezichthys* sp. A (?), AMS I.50117–001, 75.7 mm SL, freshly dead specimen from 145 m, Holmes Reef, Coral Sea, Australia; **C** *Suezichthys* sp. A (?), AMS I.32142–001, 118.5 mm SL, freshly dead specimen from 128 m, Brunswick Heads, New South Wales, Australia. Photograph **A** courtesy of the Schmidt Ocean Institute; **B** by Fenton Walsh; and **C** by Ken Graham

the Lihou Reef specimen in having the pinstripe pattern on the upper body and black spot on the posterior dorsal fin but differs in having a large black spot across the first three interspinous membrane spaces of the dorsal fin. A terminal phase specimen of yet another unidentified species of *Suezichthys* is known from a single specimen collected from northeast of Brunswick Heads, New South Wales, Australia (AMS I.32142-001; Fig. 20C). The Brunswick Heads specimen is in poor condition and has lost most of its scales, but most closely resembles *S. notatus* (Kamohara 1958) based on live colouration, with the caudal fin, body, and dorsal fin markings resembling terminal phased individuals of *S. notatus* from Taiwan (Fig. 1 in Tang et al. 2021).

Fig. 21 *Terelabrus rubrovittatus*, AMS I.51456–005, 85.0 mm SL, freshly dead specimen from 140 m, Holmes Reef, Coral Sea, Australia. Photograph by Yi-Kai Tea

Given the presence of a *Suezichthys notatus*-like species in northern New South Wales, the similarities in juvenile and female colouration of *S. notatus* and *S. arquatus*, the dearth of material from the CSMP, and the widespread, often antitropical distribution of many species in this genus, it is not possible to determine whether the specimens from Lihou Reef and Holmes Reef are conspecific, and whether they more closely resemble *S. arquatus* or *S. notatus*. Until additional material is made available, and in order to refrain from the proliferation of unnecessary synonyms, we lump the Lihou Reef, Holmes Reef, and Brunswick Heads specimens as *Suezichthys* sp. A, but note that these may comprise different, perhaps even undescribed species pending availability of more material. Nonetheless, the presence of *Suezichthys* in the CSMP constitutes a new genus record for the region.

Terelabrus rubrovittatus Randall and Fourmanoir 1998 **[CSMP^{G,S}] [AU^{S}] [V]**

Figure 21

Material examined: **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.49483-001); **Flora Reef**, **Coral Sea**, **Australia** (AMS I.51456-005 [Fig. 21])

A poorly known genus in Australia with only one other recorded species from Myrmidon Reef, Great Barrier Reef (*Terelabrus zonalis* [Fukui 2018]; QM I.41018). A pair of *Terelabrus rubrovittatus* was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 130 m in Lihou Reef, CSMP. The habitat consisted of dense *Halimeda* algal cover interspersed with sponge and coral. Syntopic species observed with it include *Odontanthias borbonius*, *Genicanthus bellus*, and *Genicanthus melanospilos*.

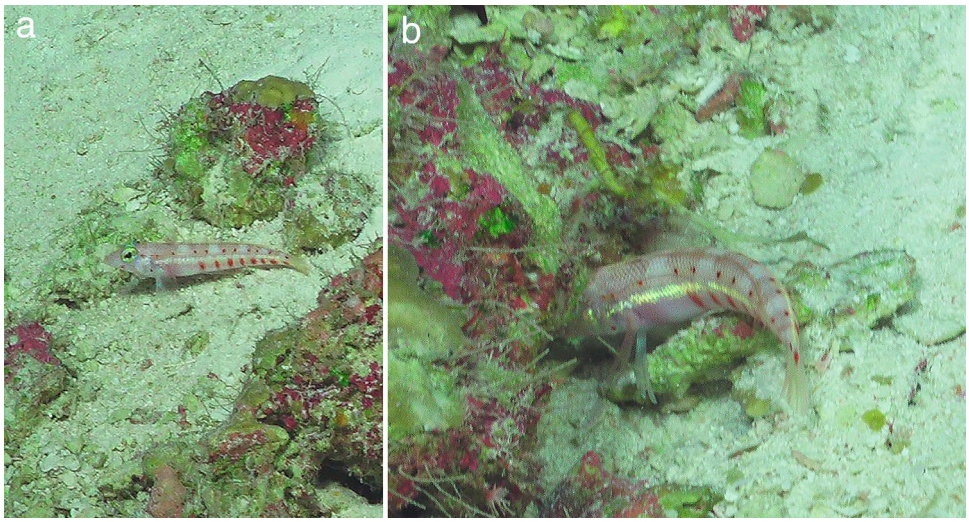

Fig. 22 **A** *Parapercis* sp. A, ROV image taken at 195 m, Tregrosse Reefs, Coral Sea, Australia. **B** Close up showing colouration details of the lateral body. Photographs courtesy of the Schmidt Ocean Institute

We report new vouchered material of this species collected at 140 m from Holmes Reef, CSMP, and at 146 m from Flora Reef, CSMP. Elsewhere, the species is known from New Caledonia, Palau, Vanuatu, Japan, Micronesia, and Western Australia (Randall and Fourmanoir 1998; Fukui and Motomura 2015; Shepherd et al. 2023).

Family PINGUIPEDIDAE

***Parapercis* sp. A [CSMP ^{S}] [AU^{S}]**

Figure 22

A single individual of an undetermined species of *Parapercis* was filmed during the RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at a depth of 163 m in the Tregrosse Reefs, CSMP. The species has five broad pale reddish-pink saddles dorsally and seven narrower red bars with dark centres ventrally, with the saddles and bars separated by a pale yellowish midlateral stripe. It belongs to a complex of six species, viz. *P. caudopellucida* (Johnson and Motomura 2017) from Andaman Sea, off Myanmar; *P. flavipinna* (Johnson and Motomura 2017) from off Panay Island, Philippines; *P. hoi* (Johnson and Motomura 2017) from Western Australia and the Philippines; *P. lembehensis* (Allen, Erdmann, and Peristiwady in Allen and Erdmann 2024) from North Sulawesi, Indonesia; *P. rota* (Sparks et al. 2021) from Western Province, Solomon Islands; and *P. sagma* (Allen and Erdmann 2012) from Indonesia and Vanuatu, all of which share a series of dark saddles dorsally, complemented on the lower body with a similar number of dark vertical bars, and a pair of dark blotches on the base of the caudal fin. The CSMP specimen differs from all other members of this group in having distinct, well-defined small dark spots at the base of the saddles (the first and last saddle with a single distinct dark spot at the base, and the middle three saddles with a pair of distinct dark spots, situated at the anterior and posterior edge). In contrast, all others lack distinct well-defined dark spots at the base of any of the saddles and have six to eight saddles (except *P. rota*, with five); hence, the CSMP individual is most likely an undescribed species.

Family SYMPHYSANODONTIDAE

Cymatognathus aureolateralis Kimura et al. 2017 **[CSMP^{G,S}] [AU^{G,S}]**

Figure 23

A deep-bodied, bright pink symphysanodontid with an oblique yellow saddle situated mid-dorsally. Multiple individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition between 246 and 301 m in multiple localities in the CSMP, including Lihou Reef, Osprey Reef, and the Tregrosse Reefs. A monotypic genus known from only a handful of records, from the type locality of Bitung, North Sulawesi, and more recently from Davao Gulf in the Philippines (Fortaleza et al. 2024). The CSMP specimens agree with the colouration description, holotype, and underwater photograph of *C. aureolateralis* from Bitung and Lembeh, Sulawesi, Indonesia (Kimura et al. 2017).

Family EPIGONIDAE

Sphyraenops bairdianus Poey 1861 **[CSMP^{G,S}]**

Fig. 23 *Cymatognathus aureolateralis*, ROV image taken at 288 m, Lihou Reef, Coral Sea, Australia. Image courtesy of the Schmidt Ocean Institute

Figure 24

Several large schools comprising close to, if not exceeding, a hundred specimens each were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition between 360 and 370 m in Lihou Reef, along steep, near vertical rock faces with deep caves and crevasses. The habitat was shared with *Epigonus* spp. and *Antigonia* spp. Elsewhere in Australia the species is known only from north of the Monte Bello Islands, Western Australia (CSIRO specimens), and from the type locality off Cuba.

Family PSEUDOTRICHONOTIDAE

***Pseudotrichonotus* sp. A [CSMP^{F,G,S}] [AU^{S}]**

Figure 25

A single individual of an undetermined species of *Pseudotrichonotus* was filmed during the RV *Falkor* 'Seamounts, Canyons and Reefs of the Coral Sea' expedition at a depth of 195 m in the Tregrosse Reefs, CSMP. The species has a pale pink, iridescent body with six well-defined orange bands, each enclosing a narrower yellow band within. The CSMP individual appears most similar to *P. altivelis* (Yoshino and Araga, 1975) from the Izu Peninsula, Japan, and *P. belos* (Gill & Pogonoski, 2016) from Western Australia, but differs from both species and all known congeneric species of *Pseudotrichonotus* based on differences in the width of the body bands. While the Coral Sea *Pseudotrichonotus* likely represents a second species for Australia, we refrain from making a definitive species identification without specimen vouchers. Nonetheless, *Pseudotrichonotus* represents a new family and genus record for the CSMP.

Family LUTJANIDAE

Paracaesio kusakarii Abe 1960 **[CSMP^{S}]**

Figure 26

A deep-bodied species with three to four pale, olive-grey bands, yellow dorsal fin, and a yellow caudal fin with the distal lobe translucent grey. One individual was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 353 m in Lihou Reef. Elsewhere in Australia the species is known from the Arafura Sea in the Northern Territory and from the Great Barrier Reef (Kramer et al. 1994).

Family **MALACANTHIDAE**

Hoplolatilus chlupatyi Klausewitz, McCosker, Randall, and Zetzsche 1978 **[CSMP^{S}] [AU^{S}] [V]**

Figure 27

Material examined: **Holmes Reef**, **Coral Sea**, **Australia** (QM I.40680 [Fig. 27]).

A species of *Hoplolatilus* known for its unusual ability to rapidly and abruptly change its body colouration due to a unique arrangement of iridophores not known in other

Fig. 24 *Sphyraenops bairdianus*, ROV image taken at 370 m, Lihou Reef, Coral Sea, Australia. Image courtesy of the Schmidt Ocean Institute

Fig. 25 *Pseudotrichonotus* sp. A, ROV image taken at 195 m, Tregrosse Reefs, Coral Sea, Australia. Image courtesy of the Schmidt Ocean Institute

teleost fishes (Goda 2017). We report new vouchered material of this species collected at 70 m from Holmes Reef, CSMP.

Family POMACANTHIDAE

Centropyge abei Allen et al. 2006 **[CSMP^{S}] [AU^{S}] [V]**

Figure 28A

Material examined: **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.49974-001; AMS I.50019-001; AMS I.51197-001; AMS I.51197-003); **Flora Reef**, **Coral Sea**, **Australia** (AMS I.51385-027; AMS I.51450-009); **Flinders Reef**, **Coral Sea**, **Australia** (CAS-ICH248432)

An unusual species of *Centropyge* readily identified by its yellowish-brown lower body, dark brown to black upper body, and a bright white band behind the eye.

Fig. 26 *Paracaesio kusakarii*, ROV image taken at 353 m, Lihou Reef, Coral Sea, Australia. Image courtesy of the Schmidt Ocean Institute

Fig. 27 *Hoplolatilus chlupatyi*, QM I.40678, 75.3 mm SL, specimen in preservation from 70 m, Holmes Reef, Coral Sea, Australia. Photograph by Jeff W. Johnson

Two individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at depths between 206 and 211 m in Willis Islet, CSMP. We report new vouchered material collected between 142 and 153 m from Holmes Reef, CSMP, between 138 and 145 m from Flora Reef, CSMP, and at 135 m from Flinders Reef, CSMP.

Centropyge colini Smith-Vaniz and Randall 1974 **[CSMP^{S}] [V]**

Figure 28B

Material examined: **Flora Reef**, **Coral Sea**, **Australia** (AMS I.50112-001; AMS I.51311-001; AMS I.51450-007); **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.51422-002; CAS-ICH248436)

A deep-bodied species of *Centropyge* easily identified by its unmarked, greenish-yellow body, and dark blue dorsum and dorsal-fin spines. In Australia, this species is known from the external Australian territories of the Cocos (Keeling) Islands and Christmas Island in the eastern Indian Ocean. We report new vouchered material collected between 82 and 112 m from Holmes Reef, and between 60 and 90 m from Flora

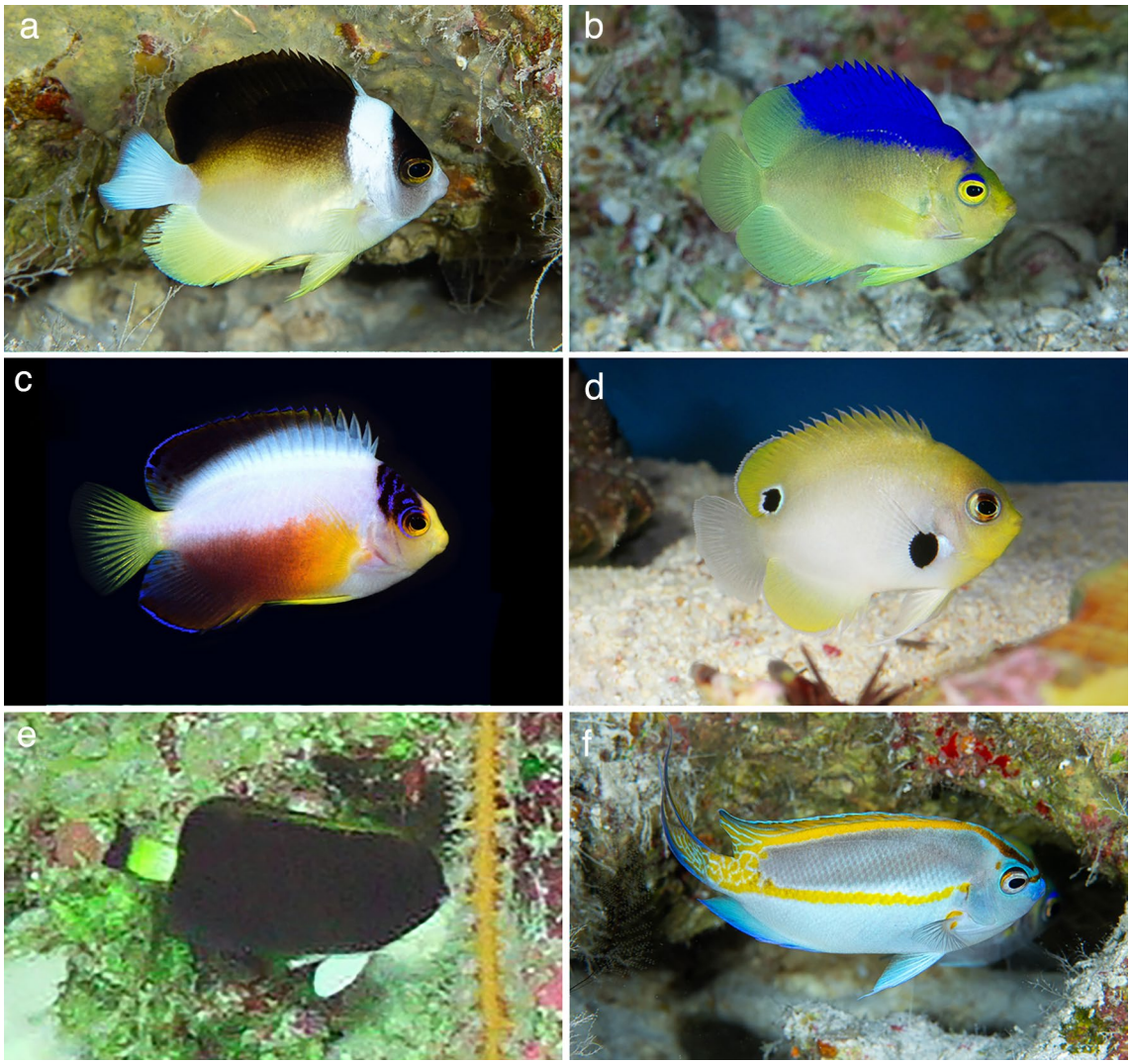

Fig. 28 **A** *Centropyge abei*, underwater photograph from 143 m, Holmes Reef, Coral Sea, Australia; **B** *Centropyge colini*, underwater photograph from 90 m, Holmes Reef, Coral Sea, Australia; **C** *Centropyge multicolor*, unretained aquarium specimen from Holmes Reef, Coral Sea, Australia; **D** *Centropyge nigriocellus*, unretained aquarium specimen from Holmes Reef, Coral Sea, Australia; **E** *Chaetodontoplus niger*, ROV image taken at 134 m, Tregrosse Reefs, Coral Sea, Australia; **F** *Genicanthus bellus*, underwater photograph from 85 m, Holmes Reef, Coral Sea, Australia. Photographs **A**–**B**, **F** by Luiz Rocha; **C** by Yi-Kai Tea; **D** by Fenton Walsh; and **E** courtesy of the Schmidt Ocean Institute

Reef, CSMP. Elsewhere, the species is widely distributed in the Indo-West and central Pacific Ocean (Randall 2005).

Centropyge multicolor Randall and Wass 1974 **[CSMP^{S}] [AU^{S}] [V]**

Figure 28C

Material examined: **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.51422-001; AMS I.51424-001)

Multiple specimens were filmed by ROV in February 2024 during the Annual Reef Health Monitoring surveys (James Cook University and Parks Australia) between 42 and 79 m at Mellish Reef, CSMP. The species was relatively abundant at multiple sites around Mellish Reef, with densities of up to 10 individuals per 150 m^2 (area based on ROV transects). Most observations comprised of single individuals. We report new vouchered material collected at 82 m from Holmes Reef, CSMP. Elsewhere the species is widespread in the central and southern Pacific (Randall 2005).

Centropyge nigriocellus Woods and Schultz 1953 **[CSMP^{S}] [AU^{S}]**

Figure 28D

Readily distinguished from all other species of *Centropyge* by its pale-yellow ground colouration, and in having two prominent black spots situated on the pectoral-fin base and on the posterior dorsal fin, respectively. A single specimen was collected by aquarium fish collectors from Holmes Reef, CSMP, in 2021 at a depth of 15 m. The specimen was not retained, but a photo was taken shortly after capture (Fig. 28D). Despite its widespread distribution across much of the Pacific Ocean and shallow depth range, the species is enigmatic and known only from sporadic and patchy records from Johnston Atoll, the Mariana Islands, the Admiralty Islands, the Line Islands, the Society Islands, the Marquesas Islands, Samoa, Papua New Guinea, and Vanuatu (Randall 2005; Delrieu-Trottin et al. 2015).

Chaetodontoplus niger Chan 1966 **[CSMP^{S}] [AU^{S}]**

Figure 28E

Readily distinguished from all other pomacanthids in having an unmarked black body, a yellow caudal fin with a broad outer black margin, and unmarked white pelvic fins. Multiple individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 97 m in Lihou Reef, and at 134 m in Tregrosse Reef in the Diamond Islets, CSMP. In all instances, the species occurred only in rhodolith beds dominated with rubble and *Halimeda* spp. In Lihou Reef, the species was observed in the company of *Pseudanthias carlsoni*, *Azurina brevirostris*, *Genicanthus watanabei*, *Genicanthus melanospilos*, and *Cirrhilabrus roseafascia*. The species is apparently anti-equatorial and known from very few records, mostly from the Northern Hemisphere in the Macclesfield Bank in the South China Sea, the Izu Peninsula, the Ryukyu Islands, the Ogasawara Islands in southern Japan. In the Southern Hemisphere, it is known from a single specimen from the Chesterfield Bank off New Caledonia in the eastern Coral Sea (Pyle 1993), and from an unpublished photograph taken of an adult also from New Caledonia (P. Plantard, pers. comm).

Genicanthus bellus Randall 1975 **[V] [*]**

Figure 28F

Material examined: **Flinders Reef**, **Coral Sea**, **Australia** (AMS I.51454-001)

Galbraith et al. (2024) reported this species as a new record for the CSMP, based on ROV footage taken at depths between 66 and 82 m in Osprey Reef and Bougainville Reefs. Multiple individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at depths between 124 and 171 m in various localities within the CSMP, including Flinders Reef, Moore Reefs, Lihou Reef, Flora Reef and the Magdelaine Cays. We report new vouchered material of this species collected at 130 m from Flinders Reef, CSMP, as well as in situ photographs taken at 85 m from Holmes Reef, CSMP. The species is also known from the external Australian territories of the Cocos (Keeling) Islands and Christmas Island in the eastern Indian Ocean, and outside of Australia the species is widely distributed in the western and central Pacific Ocean (Randall 2005).

Family CHAETODONTIDAE

Chaetodon burgessi Allen and Starck 1973 **[CSMP^{S}] [AU^{S}] [V]**

Figure 29A

Material examined: **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.49967-001)

A distinctively patterned species known from Australia on the basis of a single vouchered specimen collected at 145 m from Holmes Reef, CSMP, as well as a photograph taken at 110 m, Flora Reef, CSMP. Elsewhere, the species occurs widely in the western and central Pacific (Allen and Erdmann 2024).

Prognathodes* cf *geminus **[CSMP^{G,S}] [AU^{G,S}] [V]**

Figure 29B

Material examined: **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.51355-001; AMS I.51098-002; AMS I.51098-003; BPBM 42241; BPBM 42242; CAS-ICH 248498; CAS-ICH 248499; CSIRO H 9622-01; CSIRO H 9623-01; QM I.41409; QM I.41410; WAM P.35805-001); **Flora Reef**, **Coral Sea**, **Australia** (AMS I.51455-001)

Two individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 141 m in the Magdelaine Cays, CSMP, and at 184 m in the Tregrosse Reefs, CSMP, respectively. The species is also known from vouchered material collected between 140 and 150 m from Holmes Reef, CSMP, and at 138 m from Flora Reef, CSMP.

The Coral Sea specimens most closely resemble *Prognathodes geminus* (Copus et al. 2019) from Palau, but differ in colouration and width of the third body band, pelvic fins, and ground colouration. Given the wide-ranging nature of the genus, superficial resemblance between species, and the presence of potentially undescribed species elsewhere in

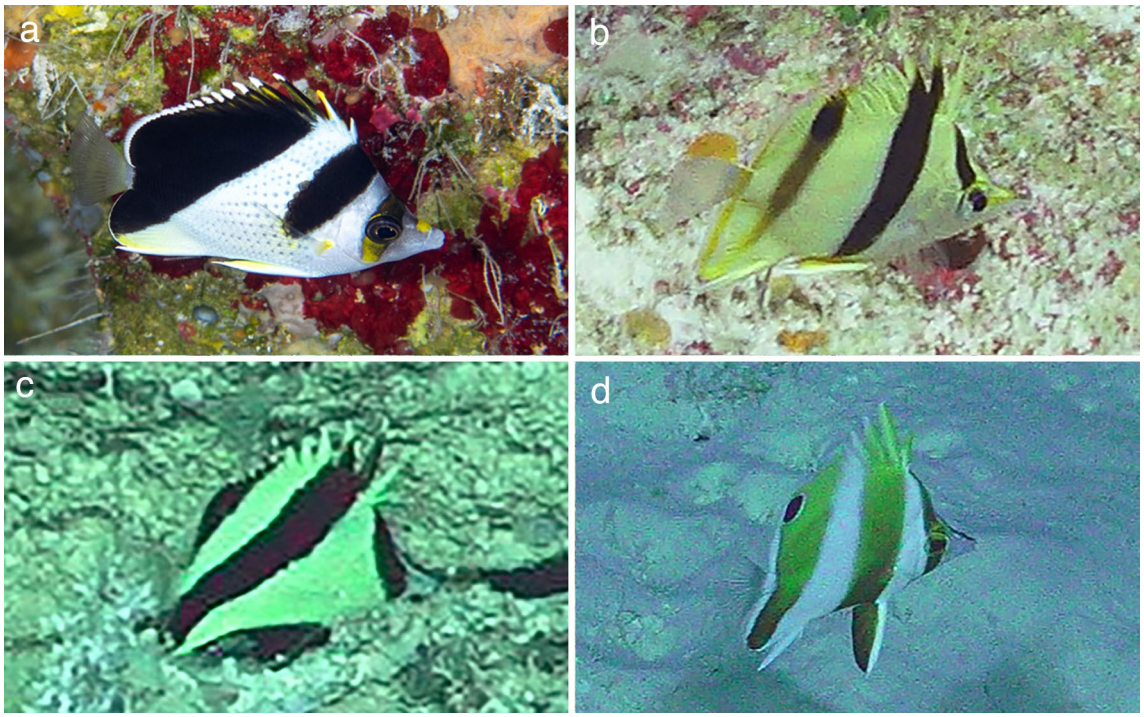

Fig. 29 **A** *Chaetodon burgessi*, underwater photograph from 110 m, Flora Reef, Coral Sea, Australia; **B** *Prognathodes* cf *geminus*, ROV image taken at 184 m, Tregrosse Reefs, Coral Sea, Australia; **C** *Prognathodes guyotensis*, ROV image taken at 320 m, Magdelaine Cays, Coral Sea, Australia; **D** *Roa* sp. A, ROV image taken at 204 m, Willis Islets, Coral Sea, Australia. Photographs **A** by Luiz Rocha; **B**–**D** courtesy of the Schmidt Ocean Institute

the Pacific (Easton et al. 2017; Yamamuchi et al. 2022), we exercise restraint in making a definitive species identification pending more exhaustive taxonomic studies. Nonetheless, the presence of *Prognathodes* represents a new distributional record for the genus in the CSMP and Australia.

Prognathodes guyotensis Yamamoto and Tameka 1982 **[CSMP^{S}] [AU^{S}]**

Figure 29C

A species of *Prognathodes* distinguished from all congeners in having black pelvic fins, and a vertical band transecting the eye. One individual was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 320 m in the Magdelaine Cays, CSMP. A widespread species but with sporadic records and few specimen vouchers, ranging from the Maldives in the Indian Ocean (Randall and De Bruin 1988), east to the Kyushu-Palau Ridge (Okamura et al. 1982) and north to Mie Prefecture (Aiba and Endo 2023), Japan, in the northwest Pacific. The species was also filmed in high definition at 269 m in Esmerelda Bank, during the 2016 NOAA *Okeanos Explorer* voyage to the Mariana Islands.

***Roa* sp. A [CSMP^{G,S}] [AU^{S}]**

Figure 29D

Two individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 225 m in Lihou Reef, and at 204 m in the Willis Islets, CSMP, respectively. Based on the key provided by Matsunuma and Motomura (2022), the Coral Sea individual most closely resembles *Roa excelsa* (Jordan, 1921) or *Roa uejoi* (Matsunuma and Motomura 2022) on the basis of colouration pattern and apparent position of the longest dorsal-fin spine. Separation of *R. excelsa* from *R. uejoi* includes scrutiny of the first pelvic-fin ray, which in the former does not extend beyond the contour of the fin in a filamentous tip (Matsunuma and Motomura 2022). Only one other species of *Roa* is known from Australia, viz. *Roa australis* from the North West Shelf of Western Australia (Kuiter 2004b). The Coral Sea specimen differs from *R. australis* in banding pattern; the latter is unique among species of *Roa* in having the second body band narrower or approximately the same width as the orbit diameter, and in having the anterior edge of the second body band not passing through the pectoral-fin base.

While the Coral Sea *Roa* likely represents a second species for Australia, and a new genus record for the CSMP, we refrain from making a definitive species identification without specimen vouchers.

Family CALLANTHIIDAE

Grammatonotus laysanus Gilbert 1905 **[CSMP^S] [AU^S]**

Figure 30A

Multiple individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at depths between 311 and 497 m in various localities in the CSMP, including Osprey Reef and Moore Reef. The individuals agree with *Grammatonotus laysanus* in having a rounded caudal fin with a single, long filamentous extension from the distal and ventral lobes (Randall et al. 1985; Anderson et al. 2018). Elsewhere, the species is wide ranging, occurring in the Hawaiian Islands, Johnston Atoll (Randall et al. 1985), the Emperor Seamount Chain (Katayama et al. 1982), Kiritimati, the Line Islands (Mundy and Parrish 2004), and the Nazca and Sala y Gómez ridges in the eastern Pacific (Parin 1991; Parin et al. 1997).

***Grammatonotus* sp. A [CSMP^S] [AU^S]**

Figure 30B

An undetermined species of *Grammatonotus* was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at a depth of 419 m in Holmes Reef, CSMP. The caudal fin of the Coral Sea individual is similar to an undescribed species from the Pao Pao Seamount in the Tokelau Seamount Ridge in the South Pacific Ocean, referred to as *Grammatonotus* sp. "crown tail" (sensu Anderson et al. 2018), but differs in having a broad, reddish-brown vertical band on its body. In their review of the genus *Grammatonotus*, Anderson et al. (2018) examined two specimens from Australia, one of which was a CSIRO specimen collected from the north-eastern Whitsunday Islands, Coral Sea [listed as *Grammatonotus* cf *macrophthalma* in Last et al. (2014); CSIRO H 643-5]. Owing to the poor condition of the spec+imen, the taxonomic status of the CSIRO specimen was not determined. Consequently, it is not possible to reconcile the identity of the newly imaged Holmes Reef individual without specimen vouchers and without better sampling of *Grammatonotus* from the Coral Sea.

***Grammatonotus* sp. B [CSMP^S] [AU^S]**

Figure 30C

One individual belonging to an undetermined species of *Grammatonotus* was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 369 m in Lihou Reef, CSMP. The species differs from *Grammatonotus* sp. A (above) in having a lanceolate caudal fin and a bright purple body without any obvious markings. It differs from the undetermined species from Western Australia (CSIRO H 5201-02) examined by Anderson et al. (2018) based on differences in live colouration and caudal fin shape. A second Australian specimen of *Grammatonotus* from the Coral Sea (CSIRO H 643–5) was examined by Anderson et al. (2018) (see above), but the specimen was too damaged to be identified. As with *Grammatonotus* sp. A, it is not possible to reconcile the identity of *Grammatonotus* sp. B without specimen vouchers.

***Grammatonotus* sp. C [CSMP^S] [AU^S]**

Figure 30D

Multiple individuals belonging to an undetermined species of *Grammatonotus* were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition between 199 and 280 m in Lihou Reef, CSMP. The species differs in colouration and appears much smaller than both *Grammatonotus* sp. A and *Grammatonotus* sp. B (above). It appears to most closely resemble *G. xanthostigma* Anderson and Johnson (2017) from Pohnpei, and *G. brianne* Anderson et al. (2016) from the Philippines in having a pinkish-purple anterior body and dorsum, and a yellow ventral body. Separation of *G. xanthostigma* from *G. brianne* is most reliable on the basis of caudal fin morphology, which was not clear in the newly imaged Coral Sea individuals. As with *Grammatonotus* sp. A and *Grammatonotus* sp. B, it is not possible to reconcile the identity of *Grammatonotus* sp. C without specimen vouchers. In all instances, the species occurred in large, loose groups above coral rubble.

***Grammatonotus* sp. D [CSMP^S] [AU^S]**

Figure 30E

An undetermined species of *Grammatonotus* was filmed during the 2020 RV *Falkor* 'Seamounts, Canyons and Reefs of the Coral Sea' expedition at a depth of 383 m in Osprey Reef, CSMP. The caudal fin of the Coral Sea individual is similar to an undescribed species from the Pao Pao Seamount in the Tokelau Seamount Ridge in the South Pacific Ocean, referred to as *Grammatonotus* sp. "crown tail" (sensu Anderson et al. 2018). It is also similar to *Grammatonotus* sp. A (above) but differs in lacking a broad, reddish-brown vertical band on its body. In their review of the genus *Grammatonotus*, Anderson et al. (2018) examined two specimens

Fig. 30 **A** *Grammatonotus laysanus*, ROV image taken at 497 m, Moore Reefs, Coral Sea, Australia; **B** *Grammatonotus* sp. A, ROV image taken at 419 m, Holmes Reef, Coral Sea, Australia; **C** *Grammatonotus* sp. B, ROV image taken at 369 m, Lihou Reef, Coral Sea, Australia; **D** *Grammatonotus* sp. C, ROV image taken at 280 m, Lihou Reef, Coral Sea, Australia; **E** *Grammatonotus* sp. D, ROV image taken at 383 m, Osprey Reef, Coral Sea, Australia. Photographs courtesy of the Schmidt Ocean Institute

from Australia, one of which was a CSIRO specimen collected from the north-eastern Whitsunday Islands, Coral Sea [listed as *Grammatonotus* cf *macrophthalma* in Last et al. (2014); CSIRO H 643-5]. Owing to the poor condition of the specimen, the taxonomic status of the CSIRO specimen was not determined. Consequently, it is not possible to reconcile the identity of the newly imaged Holmes Reef individual without specimen vouchers and without better sampling of *Grammatonotus* from the Coral Sea.

Family PRIACANTHIDAE

Pristigenys meyeri Günther 1872 **[V] [*]**

Figure 31

Material examined: **Abington Reef**, **Coral Sea**, **Australia** (AMS I.49514-001); **Flora Reef**, **Coral Sea**, **Australia** (AMS I.51450-011)

Multiple individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition between 137 and 226 m in various localities in the CSMP, including Osprey Reef, Flinders Reef, Lihou Reef, and the Tregrosse Reefs. The species was first known from the CSMP based off an ROV image taken in Osprey Reef by MARUM, University of Bremen, during deep-reef surveys. We report new vouchered material of this species collected at 147 m from Abington Reef, and at 146 m from Flora Reef, CSMP.

Family LOPHIIDAE

Fig. 31 *Pristigenys meyeri*, ROV image taken at 216 m, Tregrosse Reefs, Coral Sea, Australia. Photograph courtesy of the Schmidt Ocean Institute

***Sladenia* sp. A [CSMP^{G}]**

Figure 32A

One individual of an undetermined species of *Sladenia* was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at a depth of 870 m in Moore Reefs, CSMP. Although measurements were not available for the specimen, it appeared to be an immature specimen based on size approximation with neighbouring coral and benthic invertebrates. Since vouchered material is unavailable, and our general understanding of character variation in Australian *Sladenia* is poor, a positive identification cannot be made at this time beyond generic assignment (but see below).

Sladenia remiger Smith and Radcliffe 1912 **[CSMP^{G,S}]**

Figure 32B

Material examined: **Raine Island**, **Coral Sea**, **Australia** (QM I.24411 [Fig. 32C])

Two individuals of an undetermined species of *Sladenia* were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at a depth of 831 m in the Diamond Islets, CSMP (Fig. 32B). The individuals closely resemble one positively identified QM specimen and two positively identified CSIRO specimens of *Sladenia remiger* from northeast of Raine Island, CSMP, Australia (QM I.24411; Fig. 32C), Cascade Plateau, Tasman Sea (CSIRO H 5682–01), and between Cocos-Keeling and Christmas Island (CSIRO H 5672-07; Fig. 32D).

Sladenia remiger can be differentiated from congeners in having one vestigial spine embedded within subcutaneous tissue anterior to the post-cephalic portion of spinous dorsal fin (Ni et al. 2012). This character is also shared with *S. shaefersi* from the western North Atlantic Ocean and the Caribbean Sea, but *S. remiger* differs from *S. shaefersi* in having apparently less pronounced vermiculate markings on the head and body; in *S. shaefersi* the vermiculate pattern is more pronounced and arranged in tight rosettes (Pietsch et al. 2013).

Definitive identification of lophiid species, particularly *Sladenia*, poses great difficulty without vouchered material, owing to the dearth of fresh material and poor understanding of character variation, including body coloration. While no vouchered material for the *Sladenia* individuals observed during the RV *Falkor* expeditions are available, a conservative approach is adopted in species allocation, based largely in part on the positive identification of three specimens of *S. remiger* from scattered localities across Australian waters (including the CSMP), and the gross similarities in general appearance.

We also acknowledge the possibility of *Sladenia* sp. A (above) being conspecific with those herein identified as *Sladenia remiger*. Although the presence of *Sladenia* in the CSMP constitutes a new genus record for the region, we exercise caution in recognising only one species as new for the CSMP.

Family CHAUNACIDAE

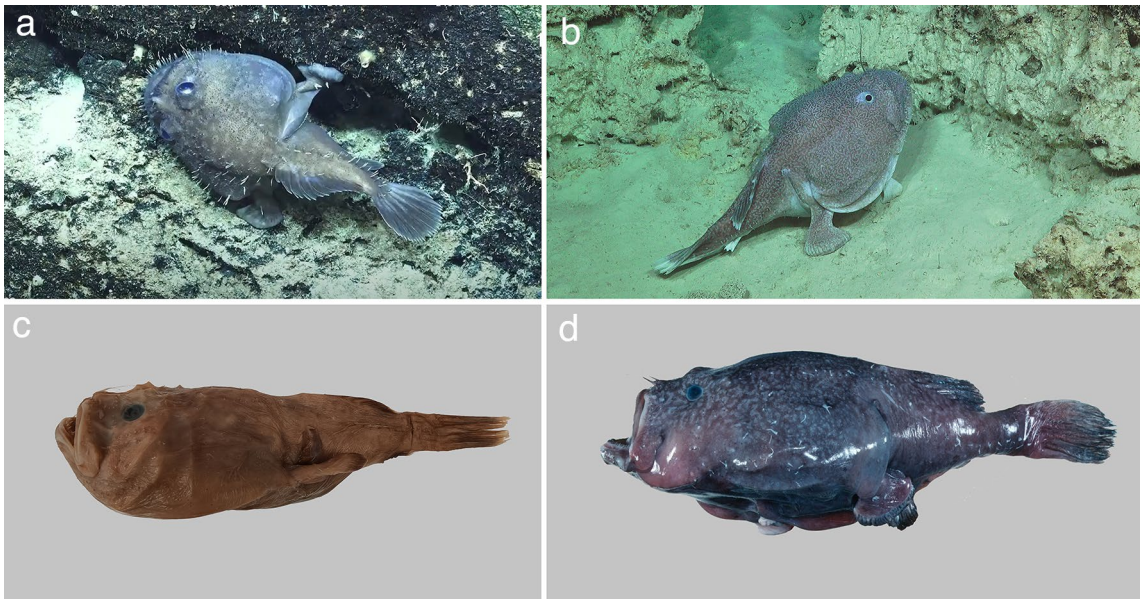

Fig. 32 **A** *Sladenia* sp. A, ROV image taken at 870 m, Moore Reefs, Coral Sea, Australia; **B** *Sladenia remiger*, ROV image taken at 831 m, Diamond Islets, Coral Sea, Australia; **C** *Sladenia remiger*, QM I.24411, 204.0 mm SL, specimen in preservation, Raine Island, Coral Sea, Australia; **D** *Sladenia remiger*, CSIRO H 5672-07, 450 mm SL, freshly dead specimen from between Cocos-Keeling and Christmas Island, Australia. Photographs **A**–**B** courtesy of the Schmidt Ocean Institute; **C** by Jeff Johnson; and **D** courtesy of CSIRO Australian National Fish Collection

Chaunax sp. A [CSMP^{S}] [AU^{S}]

Figure 33

Two individuals of an undetermined species of *Chaunax* were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at a depth of 352 m in Moore Reefs, CSMP, and 456 m in Lihou Reef, CSMP, respectively. The species appears to belong to the *Chaunax fimbriatus*-species group, diagnosed in having cirri on the head (including a dense cluster of cirri above the eye), three or more pairs of spinules in the lateral-line neuromast complex, and,

Fig. 33 *Chaunax* sp. A, ROV image taken at 456 m, Lihou Reef, Coral Sea, Australia. Photograph courtesy of the Schmidt Ocean Institute

if present, a reticulate colour pattern on dorsal surface of body (Ho et al. 2013; Ho and Last 2013).

The distinctive yellow-blotched colouration of the CSMP species appears most similar to *C. flammeus* (Le Danois, 1979), a poorly known but apparently distinctive species known only from the holotype collected off northern Madagascar in the western Indian Ocean. Given that vouchered material for the CSMP species is unavailable, and that our general understanding of live colouration, geographical distribution, and voucher material for comparative species of *Chaunax* is poor, a positive identification cannot be made at this time beyond generic assignment.

Chaunax reticulatus Ho et al. 2013 **[CSMP^{S}] [AU^{S}]**

Figure 34

A species of *Chaunax* belonging to the *Chaunax fimbriatus*-species group (see above; Ho et al. 2013; Ho and Last 2013). *Chaunax reticulatus* differs from congeners in having the dorsal body greyish with pale reticulate patterns. Two individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 560 m and 635 m, respectively, in Flinders Reef. Both individuals agree with the colouration description of type specimens collected from oceanic ridges of northern New Zealand and southern New Caledonia (Ho et al. 2013).

Family THAUMATICHTHYIDAE [CSMP^{F}] [AU^{F}]

***Thaumatichthys* sp. A [CSMP^{G,S}] [AU^{G,S}]**

Figure 35

A single metamorphosed female of an undetermined species belonging to the genus *Thaumatichthys* was filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at a depth of 1500 m in the Cairns Seamount, CSMP. The individual was filmed swimming in the water column approximately 1 m off the bottom with their head oriented downwards. Unusual among ceratioid anglerfishes, the median and pectoral fins of this individual appear to be broadly edged in white. The swimming behaviour and colouration pattern is similar to another metamorphosed female *Thaumatichthys* (identified as *T. axeli*) in an unpublished video filmed at 2000 m near the Atlantis oil fields in the Gulf of Mexico. As far as we are aware, these represent the only in situ observational records for any member of Thaumatichthyidae. The presence of *Thaumatichthys* in the CSMP represents a new genus and family record for the region, bringing the total number of families of the deep-sea anglerfish suborder Ceratioidei in Australia from 11 to 12 (Bertelsen and Pietsch 1983).

Family TRIACANTHODIDAE

Hollardia goslinei Tyler 1968 **[CSMP^{G,S}] [AU^{G,S}] [SH^{G,S}]**

Figure 36

Two individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 513 m and at 511 m in the Diamond Islets, CSMP, respectively. Elsewhere in the Pacific, the species is known only from the Hawaiian Archipelago, and Johnston Atoll (Randall et al.

Fig. 34 *Chaunax reticulatus*, ROV image taken at 635 m, Flinders Reef, Coral Sea, Australia. Photograph courtesy of the Schmidt Ocean Institute

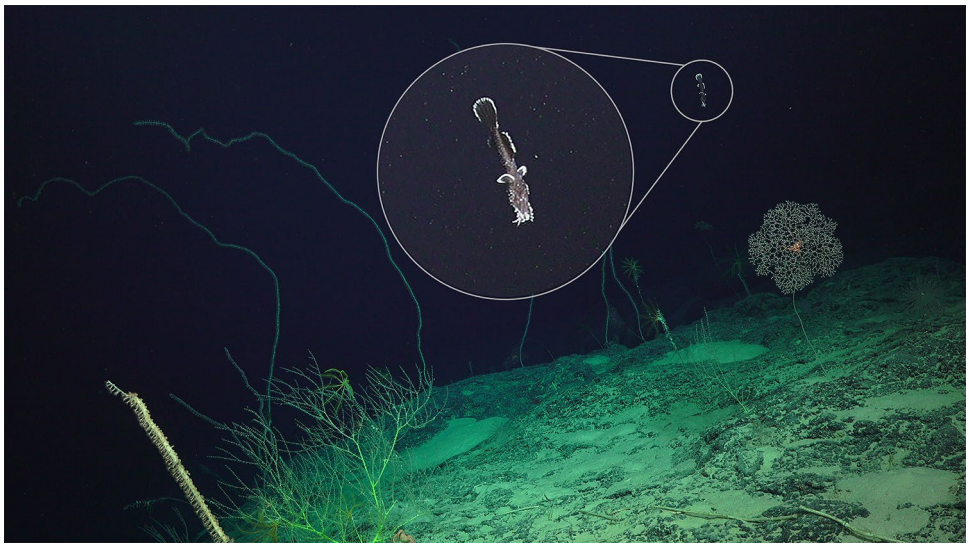

Fig. 35 *Thaumatichthys* sp. A, ROV image taken at 1500 m, Cairns Seamount, Coral Sea, Australia. Photograph courtesy of the Schmidt Ocean Institute

Fig. 36 *Hollardia goslinei*, ROV image taken at 511 m, Diamond Islets, Coral Sea, Australia. Photograph courtesy of the Schmidt Ocean Institute

1985) in the Northern Hemisphere. The species was also filmed in high definition during the 2016 NOAA *Okeanos Explorer* voyage to the Mariana Islands.

Family MONACANTHIDAE

Thamnaconus modestoides Barnard 1927 **[CSMP^{S}]**

Figure 37

A wide-ranging species of deepwater monacanthid with scattered records in Australia, notably from the Houtman Abrolhos in Western Australia, Lord Howe Rise, and scattered seamounts in the Tasman Sea. Multiple individuals were filmed during the 2020 RV *Falkor* 'Visioning the Coral Sea Marine Park' expedition at 206 m in the Willis Islets, CSMP. In Willis Islets, the species was frequently seen closely associated with *Epinephelus morrhua*.

Family BALISTIDAE

Rhinecanthus abyssus Matsuura and Shiobara 1989 **[CSMP^{S}] [AU^{S}] [V]**

Figure 38

Fig. 37 *Thamnaconus modestoides*, ROV image taken at 206 m, Willis Islets, Coral Sea, Australia. Photograph courtesy of the Schmidt Ocean Institute

Fig. 38 *Rhinecanthus abyssus*, AMS I.51191-001, 106.4 mm SL, freshly dead specimen from 145 m, Holmes Reef, Coral Sea, Australia. Photograph by Fenton Walsh

Material examined: **Holmes Reef**, **Coral Sea**, **Australia** (AMS I.51191-001 [Fig. 38]); **Jewell Reef**, **Great Barrier Reef**, **Australia** (AMS I.49959-002)

A species of deepwater balistid known only from a handful of records worldwide. The species is similar in colouration to *R. lunula* (Randall and Steene 1983) and *R. cinereus* (Bonnaterre 1788) but lacks the horseshoe-shaped ring around the caudal peduncle. We report new vouchered material of this species collected at 145 m from Holmes Reef, CSMP, and at 150 m from Jewell Reef in the Great Barrier Reef. Elsewhere, the species is known from the holotype and paratype from the Ryukyu Islands, Japan (Matsuura and Shiobara 1989), one specimen from Bitung, northeast Sulawesi (Matsuura and Peristiwady 2011), and one specimen from Wickham Island, New Georgia, Solomon Islands. The species has also been filmed in situ in the Maluku Archipelago, Indonesia (Unseen Expeditions).

Xanthichthys caeruleolineatus Randall et al. 1978 **[V] [*]**

Figure 39

Fig. 39 *Xanthichthys caeruleolineatus*, AMS I.50102-001, 300.0 mm SL, freshly dead specimen from 52 m, Flora Reef, Coral Sea, Australia. Photograph by Fenton Walsh

Material examined: **Flora Reef**, **Coral Sea**, **Australia** (AMS I.50102-001 [Fig. 39])

A wide-ranging species with a nearly pantropical distribution spanning the Indian Ocean and across the Indo-West Pacific, Hawaii, to as far east as Costa Rica in the Eastern Pacific (Randall and Mundy 1998). Despite its large global distribution, records from Australia are scarce, but include a juvenile specimen from east of the Brittania Seamounts (CSIRO H 6318-01) in southern Queensland, an unpublished observational record from Osprey Reef, CSMP (R. Steene pers. comm., in Randall and Munday 1998), BRUV footage taken at 85 m from Holmes Reef, CSMP (Galbraith et al. 2022), and ROV footage from Flinders Reef, Lihou Reef and Osprey Reef, CSMP, between 62 and 86 m (G. Galbraith unpublished data). We report new vouchered material of this species collected at 52 m from Flora Reef, CSMP.

Discussion

Mesophotic and deeper reef habitats hold diverse and ecologically distinct fish assemblages (Rocha et al. 2018). In Australia, these ecosystems are poorly quantified, though a small number of studies relying on ROV and BRUV imagery have provided valuable in situ observations into community assemblages of these remote reef ecosystems (Sih et al. 2017; Galbraith et al. 2024). Although our list of demersal fish species is almost certainly incomplete, we report 62 new fish species for the CSMP (Table 1). The largest contributors to our list of new records comprise fishes from the families Anthiadidae (11 species; 17.7% of total new observations) and Labridae (nine species; 14.5%). The families Pomacentridae (six species; 9.6%), Callanthiidae (five species; 8.1%), Pomacanthidae (five species; 8.1%), and Chaetodontidae (four species; 6.5%) were the next highest contributors. Together, these six families accounted for 64.5% of all new species records. Taxonomic representation along the depth gradient is similar to those reported elsewhere in the Pacific (Pinheiro et al. 2023), in particular the Anthiadidae [as Serranidae in Pinheiro et al. (2023)], with species richness generally increasing with depth. While these families are taxonomically rich and well-represented in shallow to deep coral reefs, their representation in our dataset is likely biased by our sampling methods, since many species belonging to these families are colourful, and/or conspicuous in their behaviour, and easier to differentiate using visual characteristics thereby favouring methods utilising high-resolution videography imagery.

In contrast, there was a paucity of reliable identifications from the families Ophidiidae (one species; 1.6%) and Gobiidae (two species; 3.2%), both of which are among the most taxonomically speciose benthic fish families; the former particularly in deep, demersal habitats. Lack of representation for these families stemmed either from limitations in species identification or from simply being overlooked by non-exhaustive video surveying. For these families, particularly the cryptobenthic Gobiidae, Apogonidae (not represented in this study) and Blenniidae (not represented in this study), accurate taxonomic identification is difficult without specimen vouchers. We therefore emphasise that while the use of high-resolution underwater imaging techniques can allow for opportunistic collection of new species records, it does not always accurately reflect the true species diversity

across sampled transects. Indeed, we posit that accurate surveys of cryptobenthic fishes cannot be done without the use of ichthyocides. In similar surveys conducted across the southwestern Pacific, cryptobenthic fish families, in particular the Gobiidae, Apogonidae, and Blenniidae, were among the highest-ranking contributors when ichthyocides were employed (see Table 1 in Fricke et al. 2011). The same caveats apply to Anguilliformes, which, although represent a major component of coral reef ichthyofauna (Fricke et al. 2011), are especially difficult to survey without extractive methods. Even on shallow water reefs, up to 30% of species (mostly cryptobenthic) may be recorded only using extractive methods (Moore et al. 2020). Utilisation of diverse survey and collection methods is therefore necessary for a more complete and comprehensive understanding of faunal composition in these poorly explored coral reef habitats.

Despite its caveats, there is still precedence for using high-resolution remote visualisation methods, particularly for exploratory baseline surveys that may later provide impetus for targeted collections. Here we provide examples where both survey methods can be employed in succession. For example, we provide species accounts for seven species that were known previously from the CSMP based only on photographs or video imagery, but which we now have specimen vouchers through field collections. The use of high-resolution videography can also be useful in areas where collecting or physical sampling is difficult, such as in mesophotic coral reef communities or deep underwater seamounts and canyons. Of the 62 species recorded as new for the CSMP, ROV video and photographic imagery contributed to over 75% of the represented data (48 species; 77.4%). A subset of 39 species (of the 46 species recorded using ROV data) were also new records for Australia, and four were new records for the Southern Hemisphere. When combined with other physical survey methods, the total number of new Australian species records is increased to 48 (77.4%). The following six genera are reported as new for Australia, viz. *Tryssogobius* (Gobiidae), *Epinnula* (Gempylidae), *Cymatognathus* (Symphysanodontidae), *Prognathodes* (Chaetodontidae), *Thaumatichthys* (Thaumatichthyidae), and *Hollardia* (Triacanthodidae). The family Thaumatichthyidae is a new family record for Australia.

Of the 62 newly reported species for the CSMP, only two species (3.2%) occurred in shallow reefs above 30 m, viz. *Cirrhilabrus beauperryi* (Labridae) and *Centropyge nigriocellus* (Pomacanthidae). The remaining 60 species (96.8%) occurred in mesophotic coral ecosystems or deeper, supporting previous studies that show positive correlations between high species turnover with increasing depth (Rocha et al. 2018; Pinheiro et al. 2023). This trend is also evident in studies conducted by Hoey et al. (2022) and Galbraith et al. (2024). The former reported five new records of coral reef fishes for the CSMP across five years where sampling depths were limited to above 12 m. In contrast, Galbraith et al. (2024) reported 50 species as new for the CSMP, of which 16 were recorded from mesophotic coral ecosystems at depths between 30 and 100 m.

Allocation of faunal affinities to each species, where possible, has enabled some comparisons with other studies in the region (e.g. Last et al. 2014). Seven species (11.3%) were assigned to the North-West Pacific biogeographical affinity, and another 16 species (25.8%) to the West Pacific category, for a total of 23 species (37.1%) that are associated with the Western Pacific Rim (Table 1). This compares to around 60 (15.3%) of West Pacific Rim species in the western Coral Sea by Last et al (2014). Of the seven species allocated to the North-West Pacific, three were previously endemic to that region prior to their discovery in the CSMP, viz. *Liopropoma japonicum* (Liopropomatidae), *Rhinopias argoliba* (Scoepaenidae), and *Bodianus thoracotaeniatus* (Labridae). The distributions of these species agree with patterns of anti-tropicality as described by Hubbs (1952) and Randall (1981).

Indian Ocean categories were well-represented and include 13 species (21.0%) from the Indo-West Pacific (compared to 19% in Last et al. 2014). Broader Pacific Ocean species, including those from the Central, South, Eastern, and Southern Pacific, were represented by 22 species (35.5%), compared to only 1.5% of Last et al. (2014). However, of the 22 species with broader distributions in the Pacific Ocean, 17 had overlapping distributions that included the Indo-West Pacific or the Western Pacific Rim. The remaining five species (8.1%) are restricted to the South Pacific Ocean basin, viz. *Odontanthias tapui* (Anthiadidae), *Odontanthias wassi* (Anthiadidae), *Pseudanthias flavicauda* (Anthiadidae), *Tosanoides bennetti* (Anthiadidae), and *Bodianus paraleucosticticus* (Labridae). Narrower ranging biogeographical categories were represented by relatively few species, with only two species (3.2%) reported from New Guinea, viz. *Cirrhilabrus beauperryi* (Labridae) and *Paracheilinus filamentosus* (Labridae). The widespread distribution for many species in the CSMP supports the 'stepping-stone hypothesis' that tropical seamounts play in the dispersal and connectivity of coral reef fishes across the Indo-Pacific, Coral Triangle, and Western Pacific (Galbraith et al. 2024).

A total of 21 species (33.9%) reported in this study could not be accurately identified beyond generic ranking. In these examples, identification could not be reliably made due to lack of voucher material, the recent collection of a voucher specimen with unresolved identity, or their status as new to science. Only one species (1.6%) in this study was allocated to the circumglobal faunal category, compared to 10% of species in Last et al. (2014). This is likely explained by differences in sampling, with our study favouring taxa from shallower depth ranges compared to mostly shelf-break to mid-continental slope sampling in Last et al. (2014).

Last et al. (2014) noted a high level of endemicity (33%) in their Coral Sea checklist. However, endemicity was not easily quantified in our study due to visual survey techniques limiting the number of species that could be positively identified. This stands in contrast to trawl survey with catch data and specimen vouchers. Although there are general similarities in sampling sites of both studies, the survey area in Last et al. (2014) also included the Marion Plateau and continental slopes, both of which lie outside the boundaries of this study. Differences in levels of endemism could also be explained by differences in sampling habitats, particularly when comparing coral reef habitats with deep continental slopes and inter-reef habitats. We emphasise that allocation of taxa to faunal categories may be confounded by data-deficient regions, the exclusion of which may inflate 'actual' levels of endemism. For example, several of the taxa listed as endemic in Last et al. (2014) may also occur in neighbouring regions outside the CSMP, such as New Caledonia and Vanuatu, and thus accurate assessment of endemicity in these regions would necessitate thorough exploration of both focal and adjacent areas. To this extent, additional research is needed to both expand on and finetune biodiversity assessments of the CSMP, although our study provides a suitable starting point for future research.

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Author contributions Y.K.T, T.L.S, and B.W.F conceived this study, but this work builds from previous work conducted in the Coral Sea region by Y.K.T, F.W, T.B, T.L.S, G.F.G, A.S.H, B.J.C, J.W.J, and others. F.W and T.B provided critical firsthand knowledge of mesophotic diving in the Coral Sea and contributed valuable specimens to this study. R.J.B and B.B were the Chief Investigators of SOI cruises 'Visioning the Coral Sea Marine Park' expedition FK200429, and 'Seamounts, Canyons and Reefs of the Coral Sea' expedition FK200802, respectively. Y.K.T was the Principal Investigator of fishes of the SOI cruise "Visioning the Coral Sea Marine Park' expedition FK200429. A.S.H, G.F.G, and B.J.C provided ROV imagery and data from Coral Reef Health Monitoring surveys and the Our Marine Parks Grants Program. SOI imagery analysis conducted by Y.K.T, T.L.S, B.W.F, A.H, K.P, S.R, I.R, J.J.P, J.W.J, A.C.G, and R.J.B. Fieldwork, specimen collection, and specimen deposition were facilitated by F.W, T.B, and L.A.R. All authors provided input for the manuscript. All authors approved the manuscript.

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Data availability No datasets were generated or analysed during the current study.

Declarations

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References

Abe T (1960) Description of a new lutjanid fish of the genus *Paracaesio* from Japan. Jpn J Ichthyol 8:56–62

Australian Biological Resources Study (ABRS) (2009) *Australian Faunal Directory*. Australian Biological Resources Study, Canberra. Viewed 22 August 2024

Aiba S, Endo H (2023) Third record of a rare butterflyfish, *Prognathodes guyotensis* (Perciformes: Chaetodontidae), from Japan. Ichthy Nat Hist Fish Jpn 34:19–22. https://doi.org/10.34583/ichthy.34.0_19

Allen GR (1974) A review of the labrid genus *Paracheilinus*, with the description of a new species from Melanesia. Pac Sci 28:449–455
Allen GR, Drew JA, Barber H (2008) *Cirrhilabrus beauperryi*, a new wrasse (Pisces: Labridae) from Melanesia. aqua. Int J Ichthyol 14:129–140
Allen GR, Erdmann MV (2012) Reef fishes of the East Indies. Perth, Australia: University of Hawai'i Press, Volumes I–III. Tropical Reef Research
Allen GR, Erdmann MV (2024) Reef fishes of the East Indies. Second Edition. University of Hawai'i Press, vol I–III. Tropical Reef Research
Allen GR, Starck WA (1973) A new species of butterflyfish (Chaetodontidae) from the Palau Islands. Tropical Fish Hobbyist, 21: 17, 18–20, 22, 26–28
Allen GR, Walsh F (2015) *Plectranthias bennetti*, a new species of anthiine fish (Pisces: Serranidae) from the Coral Sea, Australia. J Ocean Sci Found 16:82–89
Allen GR, Walsh F (2019) *Tosanoides bennetti*, a new species of anthiadine fish (Pisces: Serranidae) from the Coral Sea. Aust Aqua Int J Ichthyol 25:25–34
Allen GR, Young F, Colin PL (2006) *Centropyge abei*, a new species of deep-dwelling angelfish (Pomacanthidae) from Sulawesi, Indonesia. aqua. J Ichthyol Aquat Biol 11:13–18
Anderson WD, Greene BD, Rocha LA (2016) *Grammatonotus brianne*, a new callanthiid fish from Philippine waters, with short accounts of two other *Grammatonotus* from the Coral Triangle. Zootaxa 4173:289–295. https://doi.org/10.11646/zootaxa.4173.3.7
Anderson WD, Johnson GD (2017) Two new species of callanthiid fishes of the genus *Grammatonotus* (Percoidei: Callanthiidae) from Pohnpei, western Pacific. Zootaxa 4243:187–194. https://doi.org/10.11646/zootaxa.4243.1.10
Anderson WD, Johnson GD, Nonaka A (2018) Review of the Groppos, *Grammatonotus* (Percoidei: Callanthiidae). aqua. Int J Ichthyol 24:47–80
Arango BG, Pinheiro HT, Rocha CR, Greene BD, Pyle RL, Copus JM, Shepherd B, Rocha LA (2019) Three new species of *Chromis* (Teleostei, Pomacentridae) from mesophotic coral ecosystems of the Philippines. ZooKeys 835:1–15. https://doi.org/10.3897/zookeys.835.27528
Atlas of Living Australia website at http://www.ala.org.au. Accessed 22 August 2024
Ayling AM, Ayling AL (1985) Coral Sea National Nature Reserves. Report on a preliminary survey of the Lihou Reef and Herald/Coringa National Nature Reseves. Unpublished report for ANPWS
Baldwin CC, Tornabene L, Robertson DR (2018) Below the mesophotic. Sci Rep 8:4920. https://doi.org/10.1038/s41598-018-23067-1
Barnard KH (1927) Diagnoses of new genera and species of South African marine fishes. Ann Mag Nat Hist 20:66–79
Bennett ET (1831) The exhibition of the collection of fishes formed at the Mauritius by Mr. Telfair, ... from among them ... the following species ... believed to have been previously undescribed. Proceedings of the Committee of Science and Correspondence of the Zoological Society of London, 1830–31 (pt 1): 126–128
Bertelsen E, Pietsch TW (1983) The ceratioid anglerfishes of Australia. Rec Aust Mus 35:77–99
Bonnaterre JP (1788) Tableau encyclopédique et methodique des trois règnes de la nature... Ichthyologie. Panckoucke, Paris. i-lvi + 1–215, Pls. A-B + 1–100
Bray DJ, Gomon MF (eds) (2024) Fishes of Australia. Museums Victoria and OzFishNet, accessed 22 August 2024 (http://fishesofaustralia.net.au)
Bridge TC, Hughes TP, Guinotte JM, Bongaerts P (2013) Call to protect all coral reefs. Nat Clim Chang 3:528–530. https://doi.org/10.1038/nclimate1879
Bruner JC, Arnam S (1979) *Chromis woodsi*, a new species of damselfish (Pomacentridae) from the western Indian Ocean with a redescription of *Chromis axillaris* (Bennett), 1831. Fieldiana Zool 73:49–63
Chan WL (1966) Two new pomacanthinid angelfishes from the Macclesfield Bank, South China Sea. Ann Mag Nat Hist 8:325–334
Copus JM, Pyle RL, Greene BD, Randall JE (2019) *Prognathodes geminus*, a new species of butterflyfish (Teleostei, Chaetodontidae) from Palau. ZooKeys 835:125–137. https://doi.org/10.3897/zookeys.835.32562
Cuvier G, Valenciennes A (1828) Histoire naturelle des poissons. Tome second. Livre Troisième. Des poissons de la famille des perches, ou des percoïdes. v. 2: i-xxi + 2 pp. + 1–490, Pls. 9–40
Cuvier G, Valenciennes A (1840) Histoire naturelle des poissons. Tome quatorzième. Suite du livre seizième. Labroïdes. Livre dix-septième. Des Malacoptérygiens. Pitois-Levrault, Paris. v. 14: i-xxii + 2 pp. + 1–464 + 4 pp., Pls. 389–420
Delrieu-Trottin E, Williams JT, Bacchet P, Kulbicki M, Mourier J, Galzin R, Lison de Loma T, Mou-Tham G, Siu G, Planes S (2015) Shore fishes of the Marquesas Islands, an updated checklist with new records and new percentage of endemic species. Check List 11:1758. https://doi.org/10.15560/11.5.1758
Easton EE, Sellanes J, Gaymer CF, Morales N, Gorny M, Berkenpas E (2017) Diversity of deep-sea fishes of the Easter Island Ecoregion. Deep Sea Res Part II 137:78–88. https://doi.org/10.1016/j.dsr2.2016.12.006
Easton EE et al (2024) Unexplored seamounts of the Salas y Gómez Ridge. Expedition samples and cruise data available from the Schmidt Institute of Oceanography, accessed 09 October 2024. < https://schmidtocean.org/wp-content/uploads/FKt240108_FKt240224_SampleLog.xlsx>
Edgar GJ, Ceccarelli DM, Stuart-Smith RD (2015) Reef Life Survey Assessment of Coral Reef Biodiversity in the Coral Sea. Report for the Department of the Environment. The Reef Life Survey Foundation Inc. and Institute of Marine and Antarctic Studies
Eschmeyer WN, Hirosaki Y, Abe T (1973) Two new species of the scorpionfish genus *Rhinopias*, with comments on related genera and species. Proc Calif Acad Sci Ser 4 39:285–310
Eyal G, Laverick JH, Bongaerts P et al (2021) Mesophotic coral ecosystems of the Great Barrier Reef are understudied and unexplored. Front Mar Sci 8:622856. https://doi.org/10.3389/fmars.2021.622856
Fortaleza MA, Labrador KL, Lanutan JJ, Nañola CL (2024) First record of wavy jaw slopefish, *Cymatognathus aureolateralis* (Acropomatiformes: Symphysanodontidae), in Davao Gulf, Philippines. J Asia-Pac Biodivers 17:255–260. https://doi.org/10.1016/j.japb.2023.10.008
Fourmanoir P, Rivaton J (1979) Poissons de la pente récifale externe de Nouvelle-Calédonie et des Nouvelles-Hébrides. Cahiers De L'Indo-Pacifique 1:405–443
Fourmanoir P, Rivaton J (1980) *Plectranthias randalli* n. sp., un nouveau serranidé (anthiiné) du sud-ouest Pacifique. Revue Française d'Aquariologie Herpétologie 7:27–28
Fricke R (1992) Revision of the family Draconettidae (Teleostei) with descriptions of two new species and a new subspecies. J Nat Hist 26:165–195
Fricke R, Kulbicki M, Wantiez L (2011) Checklist of the fishes of New Caledonia, and their distribution in the Southwest Pacific Ocean (Pisces). Stuttgarter Beiträge Zur Naturkunde a, Neue Serie 4:341–463
Fujiwara K, Shibukawa K (2023) Description of a new species of *Obliquogobius* (Gobiidae: Gobiinae) from the East China Sea off

the Ryukyu Islands, southern Japan. Ichthyol Res 70:431–438. https://doi.org/10.1007/s10228-022-00901-1

Fukui Y (2018) A new species of *Terelabrus* (Perciformes: Labridae) from the Philippines with a key to species of *Terelabrus* and new record of *Terelabrus dewapyle*. Zootaxa 4526:84–90. https://doi.org/10.11646/zootaxa.4526.1.6

Fukui Y, Motomura H (2015) A new species of deepwater wrasse (Labridae: *Terelabrus*) from the western Pacific Ocean. Zootaxa 4040:559–568. https://doi.org/10.11646/zootaxa.4040.5.4

Galbraith GF, McClure E, Barnett A, et al (2022) Diving into the deep: the unique deep habitats of the Coral Sea Marine Park. Report prepared for Parks Australia

Galbraith GF, Cresswell BJ, McClure EC, Hoey AS (2024) Tropical seamounts as stepping-stones for coral reef fishes: range extensions and new regional distributions from mesophotic ecosystems in the Coral Sea, Australia. Aust Mar Biodivers 54:17. https://doi.org/10.1007/s12526-024-01404-0

Gilbert C.H. (1905) The deep-sea fishes of the Hawaiian Islands. In: *The aquatic resources of the Hawaiian Islands*. Bulletin of the U. S. Fish Commission v. 23 (pt 2): 577–713, Pls. 66–101.

Gill AC, Pogonoski JJ (2016) *Pseudotrichonotus belos* new species, first record of the fish family Pseudotrichonotidae from Australia (Teleostei: Aulopiformes). Zootaxa 4205:189–193

Gill AC, Pogonoski JJ, Moore GI, Johnson JW (2021) Review of Australian species of Plectranthias Bleeker and Selenanthias Tanaka (Teleostei: Serranidae: Anthiadinae), with descriptions of four new species. Zootaxa 4918:1–116. https://doi.org/10.11646/zootaxa.4918.1.1

Gill AC, Roberts CD (2020) *Plectranthias cruentus*, a new species of anthiadine perchlet (Teleostei: Serranidae) from the Lord Howe Rise, Tasman Sea. Zootaxa 4750:560–566. https://doi.org/10.11646/zootaxa.4750.4.6

Gill AC, Russell BC (2019) Redescription of *Anthias xanthomaculatus* Fourmanoir and Rivaton, and its reassignment to the genus *Odontanthias* Bleeker (Teleostei: Serranidae: Anthiadinae). Zootaxa 4568:117–184. https://doi.org/10.11646/zootaxa.4568.1.11

Goda M (2017) Rapid integumental color changes due to novel iridophores in the chameleon sand tilefish *Hoplolatilus chlupatyi*. Pigment Cell Melanoma Res 3:368–371. https://doi.org/10.1111/pcmr.12581

Goetze JS, Bond T, McLean DL, Saunders BJ, Langlois TJ, Lindfield S et al (2019) A field and video analysis guide for diver operated stereo-video. Methods Ecol Evol 10:1083–1090. https://doi.org/10.1111/2041-210X.13189

Gomon MF (2006) A revision of the labrid fish genus *Bodianus* with descriptions of eight new species. Rec Aust Mus Suppl 30:1–133

Gomon MF, Struthers CD (2015) Three new fishes of the Indo-Pacific fish genus *Hime* (Aulopidae, Aulopiformes), all resembling the type species *H. japonica* (Günther 1877). Zootaxa 4044:371–390

Gomon MF, Struthers CD, Stewart AL (2013) A new genus and two new species of the family Aulopidae (Aulopiformes), commonly referred to as Aulopus, Flagfins, Sergeant Bakers or Threadsails, in Australasian Waters. Spec Divers 18:141–161

Gomon MF, Walsh F (2016) A new pygmy hogfish (Labridae: *Bodianus*) of the subgenus *Trochocopus* from the tropical southern Pacific Ocean. J Ocean Sci Found 23:12–20. https://doi.org/10.5281/zenodo.161604

Günther A (1872) Report on several collections of fishes recently obtained for the British Museum. Proceedings of the Zoological Society of London (pt 3): 652–675, Pls. 53–70

Harvey ES, Shortis MR (1998) Calibration stability of an underwater stereo-video system: implications for measurement accuracy and precision. Mar Technol Soc J 32:3–17

Hellmrich LS, Saunders BJ, Parker JR, Goetze JS, Harvey ES (2023) Stereo-ROV surveys of tropical reef fishes are comparable to stereo-DOVs with reduced behavioural biases. Estuar Coast Shelf Sci 281:108210. https://doi.org/10.1016/j.ecss.2022.108210

Ho HC, Motomura H, Hata H, Jiang WC (2017) Review of the fish genus *Epinnula* Poey (Perciformes: Gempylidae), with description of a new species from the Pacific Ocean. Zootaxa 4363:393–408. https://doi.org/10.11646/zootaxa.4363.3.5

Ho HC, Motomura H, Hata H, Chiang WC (2022) *Epinnula rex* nom. nov., a replacement name for *Epinnula pacifica* Ho, Motomura, Hata and Jiang, 2017 (Teleostei: Gempylidae). Zootaxa 5141:199–200. https://doi.org/10.11646/zootaxa.5141.2.8

Ho HC, Last PR (2013) Two new species of the coffinfish genus *Chaunax* (Lophiiformes: Chaunacidae) from the Indian Ocean. Zootaxa 3710:436–448. https://doi.org/10.11646/zootaxa.3710.5.3

Ho HC, Roberts CD, Stewart AL (2013) A review of the anglerfish genus *Chaunax* (Lophiiformes: Chaunacidae) from New Zealand and adjacent waters, with descriptions of four new species. Zootaxa 3620:89–111. https://doi.org/10.11646/zootaxa.3620.1.4

Hoese DF, Bray DJ, Paxton JR, Allen GR (2006) Fishes. In: Beesley PL, Wells A (eds) Zoological catalogue of Australia, vol 35. Parts I-III. ABRS and CSIRO Publishing, Australia, pp 1–2178

Hoey AS, Burn D, Chandler JF, Huertas V, Cresswell BJ, Galbraith GF, Martin C, Barnett A, Faul S, Marzonie M, McClure EC (2024a) Coral Sea Marine Park Coral Reef Health Survey 2023–24. Report prepared for Parks Australia

Hoey AS, Galbraith GF, Burn D, Chandler J, Cresswell BJ, Huertas V, McClure EC (2024b) The Jewel in the Coral Sea: The cultural and ecological significance of Ashmore and Boot Reefs. Report prepared for Parks Australia

Hoey AS, Harrison H, Pratchett M (2020) Coral Reef Health in the Coral Sea Marine Park – Surveys 2018–2020, Report prepared for Parks Australia

Hoey AS, McClure EC, Burn D, et al (2022) Coral Sea Marine Park Coral Reef Health Survey 2022. Report prepared for Parks Australia

Hubbs CL (1952) Antitropical distribution of fishes and other organisms. Symposium on problems of bipolarity and of pantemperate faunas. Proc Sixth Pacific Sci Congr Pac Sci Assoc 3:324–329

Johnson JW, Motomura H (2017) Five new species *Parapercis* (Perciformes: Pinguipedidae) from southeast Asia and northwest Australia. Zootaxa 4320:121–145. https://doi.org/10.11646/zootaxa.4320.1.7

Kamohara T (1952) Revised descriptions of the offshore bottom-fishes of Prov. Tosa, Shikoku, Japan. Res Rep Kochi Univ Natu Sci 3:1–122

Kamohara T (1958) A review of the labrid fishes found in the waters of Kochi Prefecture, Japan. Rep USA Mar Biol Stat 5:1–20

Katayama M, Yamamoto E, Yamakawa T (1982) A review of the serranid fish genus *Grammatonotus*, with description of a new species. Jpn J Ichthyol 28:368–374. https://doi.org/10.11369/jji1950.28.368

Kato S (2016) Wrasses and Parrotfishes Illustrated. Seibundo Shinkosha, Tokyo, p 317

Kennedy BRC, Cantwell K, Mali M, Kelley C, Potter J, Elliott K et al (2019) The unknown and the unexplored: insights into the Pacific deep-sea following NOAA CAPSTONE expeditions. Front Mar Sci 6:103389. https://doi.org/10.3389/fmars.2019.00480

Kim S, Yoo JM, Lee EK (2004) Description of a postflexion larval specimen of *Liopropoma japonicum* (Döderlein) off Jeju Island, Korea. Ocean Pol Res 26:685–688 (**in Korean**)

Kimura S, Johnson GD, Peristiwady T, Matsuura K (2017) A new genus and species of the family Symphysanodontidae, *Cymatognathus aureolateralis* (Actinopterygii: Perciformes) from

Indonesia. Zootaxa 4277:51–66. https://doi.org/10.11646/zootaxa.4277.1.4
Klausewitz W, McCosker JE, Randall JE, Zetsche H (1978) Hoplolatilus chlupatyi n. sp., un nouveau poisson marin des Philippines (Pisces, Perciformes, Percoidei, Branchiostegidae). Revue Française d'Aquariologie Herpétologie 5:41–48
Kramer SH, Kramer SM, Newman SJ (1994) New deep-water fish records from the Great Barrier Reef, Australia. Pac Sci 48:70–79
Kuiter RH (2004a) Basslets, hamlets, and their telatives: a comprehensive guide to selected serranidae and plesiopidae. TMC Publishing, Chorleywood, UK, p 216
Kuiter RH (2004b) Description of a new species of Butterflyfish, *Roa australis*, from northwestern Australia (Pisces: Perciformes: Chaetodontidae). Rec Aust Mus 56:167–171
Kuiter RH (2010) Labridae Fishes: Wrasses. Aquatic Photographics, Seaford, Australia, p 398
Langlois T, Goetze J, Bond T, Monk J, Abesamis RA, Asher J, Harvey ES (2020) A field and video annotation guide for baited remote underwater stereo-video surveys of demersal fish assemblages. Methods Ecol Evol 11:1401–1409. https://doi.org/10.1111/2041-210X.13470
Last PR, White WT, Gledhill DC, Pogonoski JJ, Lyne V, Bax NJ (2011) Biogeographic structure and affinities of the marine demersal ichthyofauna of Australia. J Biogeogr 38:1484–1496. https://doi.org/10.1111/j.1365-2699.2011.02484.x
Last PR, Pogonoski JJ, Gledhill DC et al (2014) The deepwater demersal ichthyofauna of the western Coral Sea. Zootaxa 3887:191–224. https://doi.org/10.11646/zootaxa.3887.2.4
Lee SH, Lee MY, Matsunuma M, Chen WJ (2019) Exploring the phylogeny and species diversity of *Chelidoperca* (Teleostei: Serranidae) from the western Pacific Ocean by an integrated approach in systematics, with descriptions of three new species and a redescription of *C. lecromi* Fourmanoir, 1982. Front Mar Sci 6:1–26. https://doi.org/10.3389/fmars.2019.00465
Lin PL, Shao KT, Chen JP (1994) Five new records of coastal fishes from western Taiwan. Zool Stud 33:174–176
Loya Y, Eyal G, Treibitz T et al (2016) Theme section on mesophotic coral ecosystems: advances in knowledge and future perspectives. Coral Reefs 35:1–9. https://doi.org/10.1007/s00338-016-1410-7
Masuda H, Araga C, Yoshino T (1975) Coastal fishes of southern Japan. Tokai University Press, Tokyo, p 379
Matsunuma M, Hoang TA, Tachihara K, Hirasaka H, Motomura H (2024) *Chelidoperca pulchella* and *C. pollux*, two new perchlet species (Serranidae) from the northwestern Pacific Ocean. Ichthyol Res. https://doi.org/10.1007/s10228-024-00952-6
Matsunuma M, Motomura H (2022) Two new species of the butterflyfish genus *Roa* (Perciformes: Chaetodontidae). J Fish Biol 100:758–774. https://doi.org/10.1111/jfb.14993
Matsuura K, Shiobara Y (1989) A new triggerfish, *Rhinecanthus abyssus*, from the Ryukyu Islands. Jpn J Ichthyol 36:315–317. https://doi.org/10.11369/jji1950.36.315
Matsuura K, Peristiwady T (2011) Second record of the rare triggerfish, *Rhinecanthus abyssus* Matsuura and Shiobara, 1989 (Actinopterygii, Tetraodontiformes, Balistidae) from Sulawesi, Indonesia. Bull Natl Sci Mus Ser A 37:217–219
McKinnon AD, Williams A, Young J et al (2014) Tropical marginal seas: priority regions for managing marine biodiversity and ecosystem function. Ann Rev Mar Sci 6:415–437. https://doi.org/10.1146/annurev-marine-010213-135042
Moore GI, Morrison SM, Johnson J (2020) The distribution of shallow reef fishes of the Kimberley, Western Australia, based on a long-term dataset and multiple methods. Rec Western Aust Mus Suppl 85:105–115. https://doi.org/10.18195/issn.0313-122x.85.2020.105-115
Mundy BC, Parrish FA (2004) New Records of the fish genus *Grammatonotus* (Teleostei: Perciformes: Percoidei: Callanthiidae) from the Central Pacific, including a spectacular species in the Northwestern Hawaiian Islands. Pac Sci 58:403–417. https://doi.org/10.1353/psc.2004.0033
Ni Y, Wu HL, Li S (2012) A new species of the genus *Sladenia* (Pisces, Lophiidae) from the East China Sea and the South China Sea. Acta Zootaxonom Sin 37:211–216
Okamura O, Amaoka K, Mitani F (1982) Fishes of the Kyushu-Palau Ridge and Tosa Bay. The intensive research of unexploited fishery resources on continental slopes. Japan Fisheries Resource Conservation Association, Tokyo, p 435
Oxley W, Ayling AL, Cheal A, Osborne K (2004) Marine surveys undertaken in the Elizabeth and Middleton Reefs Marine National Nature Reserve, December 2003, Townsville, QLD. Australian Institute of Marine Science
Parin NV (1991) Fish fauna of the Nazca and Sala y Gómez submarine ridges, the easternmost outpost of the Indo-West Pacific zoogeographic region. Bull Mar Sci 49:671–683
Parin NV, Mironov AN, Nesis KN (1997) Biology of the Nazca and Sala y Gómez submarine ridges, an outpost of the Indo-West Pacific fauna in the eastern Pacific Ocean: Composition and distribution of the fauna, its communities and history. Adv Mar Biol 32:145–242. https://doi.org/10.1016/S0065-2881(08)60017-6
Peristiwady T, Makatipu PC, Satrioajie WN, Wibowo K (2014) Two new records of anthiine fishes genus *Plectranthias* (Perciformes: Serranidae) from Indonesia. Mar Res Indones 39:87–93. https://doi.org/10.14203/mri.v39i2.89
Pietsch TW, Ross SW, Caruso JH, Saunders MG, Fisher CR (2013) *In-situ* observations of the deep-sea Goosefish *Sladenia shaefersi* Caruso and Bullis (Lophiiformes: Lophiidae), with evidence of extreme sexual dimorphism. Copeia 4:660–665. https://doi.org/10.1643/CI-13-023
Pinheiro HT, MacDonald C, Quimbayo JP, Shepherd B, Phelps TA, Loss AC, Teixeira JB, Rocha LA (2023) Assembly rules of coral reef fish communities along the depth gradient. Curr Biol 33:1421–1430. https://doi.org/10.1016/j.cub.2023.02.040
Poey F (1861) Memorias sobra la historia natural de la Isla de Cuba, acompañadas de sumarios Latinos y extractos en Francés. Tomo 2. La Habana. v. 2: 1–96, Pls. 1–19
Pogonoski JJ, Gill AC (2021) Taxonomy of the genus *Dactylanthias* Bleeker (Teleostei: Serranidae: Anthiadinae). Zootaxa 4926:417–430. https://doi.org/10.11646/zootaxa.4926.3.6
Prokofiev AM (2008) A new species of the genus *Aulopus* from the waters of Vietnam (Myctophiformes s. lato: Aulopidae). J Ichthyol 48:134–137
Pyle RL (1993) A systematic treatment of the reef-fish family Pomacanthidae (Pisces: Perciformes). PhD Thesis, University of Hawaii
Pyle RL, Earle JL, Greene BD (2008) Five new species of the damselfish genus *Chromis* (Perciformes: Labroidei: Pomacentridae) from deep coral reefs in the tropical western pacific. Zootaxa 1671:3–31. https://doi.org/10.11646/zootaxa.1671.1.2
Pyle RL, Kosaki RK, Pinheiro HT et al (2019) Fishes: biodiversity. In: Loya Y, Puglise KA, Bridge TCL (eds) Mesophotic coral ecosystems. Springer, New York, pp 749–777
Radcliffe L (1912) New pediculate fishes from the Philippine Islands and contiguous waters. Proc US Natl Mus 42:199–214
Randall JE (1975) A revision of the Indo-Pacific angelfish genus *Genicanthus*, with descriptions of three new species. Bull Mar Sci 25:393–421
Randall JE (1981) Two new Indo-Pacific labrid fishes of the genus *Halichoeres*, with notes on other species of the genus. Pac Sci 34:415–432
Randall JE (2005) Reef and shore fishes of the south Pacific: New Caledonia to Tahiti and the Pitcairn Islands. University of Hawaii Press, Honolulu, Hawaii, USA, p 707

Randall JE (2006) Three new species of the gobiid fish genus *Trysogobius* from the western and South Pacific. Aqua J Ichthyol Aquat Biol 11:105–116

Randall JE, De Bruin GHP (1988) The butterflyfish *Prognathodes guyotensis* from the Maldive Islands, a first record for the Indian Ocean. Cybium 12:145–149

Randall JE, Fourmanoir P (1998) *Terelabrus rubrovittatus*, a new genus and species of labrid fish from New Caledonia and New Guinea. Bull Mar Sci 62:247–252

Randall JE, Heemstra PC (2006) Review of the Indo-Pacific fishes of the genus *Odontanthias* (Serranidae: Anthiinae), with descriptions of two new species and a related genus. Indo-Pac Fishes 38:1–32

Randall JE, Kuiter RH (1989) *Cirrhilabrus punctatus*, a new species of labrid fish from the southwestern Pacific. Revue Française d'Aquariologie Herpétologie 16:4350

Randall JE, Lobel PS, Chave EH (1985) Annotated checklist of the fishes of Johnston Island. Pac Sci 39:24–80

Randall JE, Lubbock R (1981) A revision of the serranid fishes of the subgenus *Mirolabrichthys* (Anthiinae: *Anthias*), with descriptions of five new species. Contrib Sci 333:1–27

Randall JE, Lubbock R (1982) Three new labrid fishes of the new genus *Cirrhilabrus* from the southwestern Pacific. Occas Pap Bernice Pauahi Bishop Mus 25:1–12

Randall JE, Maugé AL, Plessis YB (1979) Two new anthiine fishes of the genus *Holanthias* from the southern and western Pacific. Jpn J Ichthyol 26:15–25. https://doi.org/10.11369/jji1950.26.15

Randall JE, Matsuura K, Zama A (1978) A revision of the triggerfish genus *Xanthichthys*, with description of a new species. Bull Mar Sci 28:688–706

Randall JE, Mundy BC (1998) *Balistes polylepis* and *Xanthichthys caeruleolineatus*, two large triggerfishes (Tetraodontiformes: Balistidae) from the Hawaiian Islands, with a key to Hawaiian species. Pac Sci 52:322–333

Randall JE, Pyle RL (2001) Four new serranid fishes of the anthiine genus *Pseudanthias* from the South Pacific. Raffles Bull Zool 49:19–34

Randall JE, Randall HA (1981) A revision of the labrid fish genus *Pseudojuloides*, with descriptions of five new species. Pac Sci 35:51–74

Randall JE, Shimizu T (1994) *Plectranthias pelicieri*, a new anthiine fish (Perciformes: Serranidae) from Mauritius, with notes on *P. gardineri*. Jpn J Ichthyol 41:109–115. https://doi.org/10.11369/jji1950.41.109

Randall JE, Steene RC (1983) *Rhinecanthus lunula* a new species of triggerfish from the South Pacific. Freshw Mar Aquar 6:45–51

Randall JE, Taylor L (1988) Review of the Indo-Pacific fishes of the serranid genus *Liopropoma*, with descriptions of seven new species. Indo-Pac Fishes 16:1–47

Randall JE, Walsh FM (2008) A pictorial review of the Indo-Pacific labrid fish genus *Pseudocoris*, with description of a new species from the Coral Sea. aqua. Int J Ichthyol 14:45–58

Randall JE, Walsh FM (2010) *Rabaulichthys squirei*, a new species of sailfin anthias (Serranidae: Anthiinae) from the Coral Sea. Mem Qld Mus Nature 55:205–211

Randall JE, Wass RC (1974) Two new pomacanthid fishes of the genus *Centropyge* from Oceania. Jpn J Ichthyol 21:137–144. https://doi.org/10.11369/jji1950.21.137

Roberts CD, Stewart AL, Struthers CD (2015) The fishes of New Zealand. Vols I–III. Te Papa Press, Wellington, New Zealand, pp 1–1748

Rocha LA, Pinheiro HT, Shepherd B, Papastamatiou YP, Luiz OJ, Pyle RL, Bongaerts P (2018) Mesophotic coral ecosystems are threatened and ecologically distinct from shallow water reefs. Science 361:281–284. https://doi.org/10.1126/science.aaq1614

Russell BC (1985) Revision of the Indo-Pacific labrid fish genus *Suezichthys*, with descriptions of four new species. Indo-Pacific Fishes 2:1–21

Sabaj M.H. (2023) Codes for natural history collections in ichthyology and herpetology (online supplement). Version 9.5 (10 Nov 2023). Electronically accessible at https://asih.org, American Society of Ichthyologists and Herpetologists, Washington, DC

Schultz LP, Herald ES, Lachner EA, Welander AD, Woods LP (1953) Fishes of the marshall and marianas islands. Vol. I. Families from Asymmetrontidae through Siganidae. Bulletin of the United States National Museum, 202, v. 1: i-xxxii + 1–685, Pls. 1–74

Selig GM, Drazen JC, Auster PJ, Mundy BC, Kelley CD (2023) Distribution and structure of deep-sea demersal fish assemblages across the central and western Pacific Ocean using data from undersea imagery. Front Mar Sci 10:1219368. https://doi.org/10.3389/fmars.2023.1219368

Senou H (1993) Serranidae. In: Nakabo T (ed) Fishes of Japan with pictorial keys to the species. Tokai University Press, Tokyo, p 1306

Senou H, Matsuura K, Shinohara G (2006) Checklist of fishes in Sagami Sea with zoogeographical comments on shallow water fishes occurring along the coastlines under the influence of the Kuroshio Current. Mem Natl Sci Mus 41:389–542

Shepherd B, Pinheiro HT, Phelps TAY, Siu G, Rocha LA (2023) *Terelabrus toretore* sp. nov. (Perciformes: Labridae), a new species of striped hogfish from Tahiti, with range extensions for two congeners. Zool Stud 62:8. https://doi.org/10.6620/ZS.2023.62-08

Shortis MR, Harvey ES (1998) Design and calibration of an underwater stereo-video system for the monitoring of marine fauna populations. Int Arch Photogr Remote Sens 32:792–799

Shortis MR, Abdo EHD (2016) A review of underwater stereo-image measurement for marine biology and ecology applications. In: Gibson RN, Atkinson RJA, Gordon JDM (eds) Oceanography and Marine Biology. CRC Press, Boca Raton, pp 269–304

Sih TL, Cappo M, Kingsford M (2017) Deep-reef fish assemblages of the Great Barrier Reef shelf-break (Australia). Sci Rep 7:10886. https://doi.org/10.1038/s41598-017-11452-1

Siu G, Bacchet P, Bernardi G, Brooks AJ, Carlot J, Causse R, Claudet J, Clua E, Delrieu-Trottin E, Espiau B, Harmelin-Vivien M et al (2017) Shore fishes of French Polynesia. Cybium 41:245–278

Smith-Vaniz WF, Randall JE (1974) Two new species of angelfishes (*Centropyge*) from the Cocos-Keeling Islands. Proc Acad Natl Sci Phila 126:105–113

Sparks JS, Chaloux N, Schelley RC, Gruber DF, Sparks TS, Phillips BT (2021) Description of a new species of rariphotic *Paracercis* (Perciformes: Pinguipedidae) from the Solomon Islands. Am Mus Novit 3978:1–12. https://doi.org/10.1206/3978.1

Steindachner F, Döderlein L (1883) Beiträge zur Kenntniss der Fische Japans (I). Anzeiger der Kaiserlichen Akademie der Wissenschaften, Wien, Mathematisch-Naturwissenschaftliche Classe v. 20: 49–50

Stewart AL (2015) Family Gempylidae. In: Roberts CD, Stewart AL, Struthers CD (eds) The fishes of New Zealand, vol Four. Te Papa Press, New Zealand, pp 1602–1615

Tang CN, Chen HM, Ho HC (2021) A new record of a rare labrid, *Suezichthys notatus* (Actinopterygii: Labridae), from Taiwan, with comparison to related species from Taiwan. Acta Ichthyol Piscat 51:393–401. https://doi.org/10.3897/aiep.51.64061

Thomson JM (1967) New species and new records of fish from Queensland. Proc Linnean Soc NSW 92:145–150

Tea YK, Walsh F (2023) Review of Australian species of *Paracheilinus* Fourmanoir (Teleostei: Labridae), with description of a new species from the Great Barrier Reef and Coral Sea. Ichthyol Herpetol 111:397–415. https://doi.org/10.1643/i2023019

Tyler JC (1968) A monograph on plectognath fishes of the superfamily Triacanthoidea. Monogr Acad Nat Sci Phila 16:1–364

Van der Laan R, Fricke R, Eschmeyer WN (eds) (2024) Eschmeyer's Catalog of Fishes: classification. (http://www.calacademy.org/scientists/catalog-of-fishes-classification/). Electronic version accessed 12 Sep 2024

Walsh FM (2014) *Cirrhilabrus squirei*, a new wrasse (Perciformes; Labridae) from the Great Barrier Reef and Coral Sea, Australia. aqua. Int J Ichthyol 20:123–130

Whitley GP (1941) Ichthyological notes and illustrations. Aust Zool 10:1–50

Yamamuchi S, Koyama Y, Mori T, Iwata M (2022) A record of two deep-sea fish species photographed in the water around Soufu rock. Bull Biogeogr Soc Jpn 77:98–105

Zajonz U, Bogorodsky SV, Victor BC (2020) First record of *Meganthias natalensis* (Actinopterygii: Serranidae: Anthiadinae) from Socotra Archipelago (North-western Indian Ocean), with notes on *Odontanthias* and *Sacura*. Acta Ichthyol Piscat 50:501–510. https://doi.org/10.3750/AIEP/03080